THE

KANSAS UNIVERSITY

SCIENCE BULLETIN

VOL. XIV, NO. 3—OCTOBER, 1922.

(Whole Series, Vol. XXIV, No. 3.)

ENTOMOLOGY NUMBER V.

CONTENTS:

THE MEMBRACIDÆ OF KANSAS (HOMOPTERA).....*P. B. Lawson.*

PUBLISHED BY THE UNIVERSITY

LAWRENCE, KAN.

Entered at the post office in Lawrence as second-class matter.

9-4522

TABLE OF CONTENTS.

	PAGE
Introduction	31
Distribution	32
Structural characteristics	36
The male genitalia	38
Phylogeny of the family	41
Life history	41
Economic importance	43
List of Kansas species	44
Systematic treatment of Kansas species	45
Subfamily CENTROTINÆ	45
The genus *Microcentrus*	45
Subfamily MEMBRACINÆ	47
The genus *Campylenchia*	47
The genus *Enchenopa*	48
Subfamily SMILIINÆ	50
The genus *Ceresa*	51
The genus *Stictocephala*	59
The genus *Acutalis*	62
The genus *Micrutalis*	63
The genus *Carynota*	64
The genus *Thelia*	65
The genus *Glossonotus*	67
The genus *Heliria*	68
The genus *Telamona*	69
The genus *Telamonanthe*	77
The genus *Archasia*	78
The genus *Smilia*	79
The genus *Cyrtolobus*	80
The genus *Ophiderma*	87
The genus *Vanduzea*	89
The genus *Entylia*	90
The genus *Publilia*	91
Index	107

THE KANSAS UNIVERSITY
SCIENCE BULLETIN

VOL. XIV.] OCTOBER, 1922. [No. 3.

The Membracidæ of Kansas.

By P. B. LAWSON,
Professor of Entomology, University of Kansas.

INTRODUCTION.

THE writer has been interested in recent years in a systematic study of the Homoptera of Kansas. He has previously published papers on the Coccidæ, Cicadellidæ and Cicadidæ of the state, listing over 300 species of the members of these families known to occur within the borders of Kansas.

The membracids of the state have been previously studied by Miss Hazel Branch, who in 1914 published a paper in the KANSAS UNIVERSITY SCIENCE BULLETIN, volume 8, on the biology of the Membracidæ of Kansas. In that paper she listed nineteen species from the state. Since that time quite a little collecting has been done, until to-day, including some species taken around Kansas City, Mo., which species are therefore sure to occur in eastern Kansas also, there are records of the occurrence of at least fifty-five species of tree hoppers in our fauna. Further collecting will of course reveal a goodly number of additional species, but the writer has thought it advisable to bring our data up to date at this time.

The writer is greatly indebted to Dr. W. D. Funkhouser, of the University of Kentucky, who has made many determinations for him and been very generous in giving helpful suggestions and encouragement during the course of this study. Moreover, his paper on the biology of the Membracidæ of the Cayuga Lake Basin has been very freely drawn upon, especially in the use of the technical descriptions.

Through the kindness of Professors Geo. A. Dean and Roger Smith, the records of the Kansas State Agricultural College are included in this paper, most of the records from Riley county and several others being from that collection.

DISTRIBUTION.

The Membracidæ, though primarily a tropical and subtropical family, are nevertheless found widely scattered and are well represented in temperate regions. Authorities are agreed that they are best represented in the fauna of Central and South America, but it seems certain that when the fauna of Africa and Southern Asia have been as carefully studied that these regions will also be found to be very rich in these insects.

Dr. W. D. Funkhouser gives the following distribution of the family according to geographical life zones:

Palearctic region:

(Europe, the temperate parts of Asia, and the north of Africa; Iceland and the islands of the Atlantic; limited by the Himalayas.)

Very poorly represented. Only two or three genera on the entire continent of Europe, but two species in Great Britain, two species in Russia, and none reported from Iceland. A few in northern Africa, chiefly forms that have migrated from the south.

Ethiopian region:

(Africa and its islands, except the northern parts; Arabia.)

Rich in genera and species. Little work has been done on these forms of the family, but there is evidence of an abundant membracid fauna.

Oriental region:

(India and the East Indies.)

Extremely rich both in number of forms represented and in number of individuals. The center of distribution for the subfamily Centrotinæ.

Australian region:

(Australia, New Zealand and neighboring islands.)

Well represented by rather distinct forms. The region has been fairly well worked and has yielded a large number of species.

Nearctic region:

(America north of Mexico; Greenland).

Forty or fifty genera, gradually becoming less abundant northward. A few species common in Canada as far north as Perry Sound. None reported from Greenland.

Neotropical region:

(Mexico, West Indies, Central and South America.)

The most important of all the regions for the Membracidæ. Central America and the northern part of South America have yielded as many species as all the rest of the world together.

Altogether over 300 genera have been erected, which contain something like 1,500 species. Many of these genera are found in

more than one of the above regions, but the number of such species is seemingly rather limited. Thus the American genera *Ceresa* and *Stictocephala*, while well represented in both the Nearctic and Neotropical regions, scarcely have a single species that occurs in both regions. On the other hand, it is well known that some forms, such as *Micrutalis calva* (Say), are found in both the United States and the West Indies.

In North America the members of this family are best represented in Mexico. As we advance northward they become fewer and fewer till comparatively few species are found in Canada, where they reach their northern limit. Van Duzee lists 41 genera in his catalogue of the Hemiptera of North America north of Mexico. It is perhaps safe to say that the number of genera for this region does not exceed fifty. The number of species is listed at 185, which compares very favorably with the 25 cercopids and the 74 cicadas, but falls far short of the 357 fulgorids and the 698 cicadellids which occur in the same territory. Thus it is seen that in the United States this family stands midway in membership among the five families of the Homoptera-Auchenorhynchi.

So far the membracid fauna of Kansas is known to be represented by 20 genera. Further collecting will doubtless reveal the presence of several other genera, and of course the number of species will also be increased, for, after all, there has been rather little attention paid to this family in the work of past collectors in this state. This is shown by the fact that only about 50 out of the 105 counties of the state have as yet furnished us with specimens. However, these counties are so well distributed as to give us a very fair idea of the membracid fauna of the entire state.

The genera *Telamona* and *Cyrtolobus* show the most species in the state, each having some ten or eleven species. These genera are, however, not the ones that are most commonly seen, for both *Stictocephala* and *Ceresa* are far more abundant as to individuals, *Ceresa bubalus* (Fabr.) being by far the commonest species in the state. Close to the two latter genera comes *Micrutalis*, the species *calva* having been taken in about fifteen counties. *Campylenchia latipes* is also very common throughout the alfalfa fields of the state. *Vanduzea triguttata* (Burm.) occurs in enormous numbers when taken, as does *Entylia concisa* (Walk.), but hitherto these species have not been taken in many places within our borders.

EXPLANATION OF PLATE I.

1. Pronotum and head of *Ceresa bubalus*. *sp*, suprahumerals; *m*, metopidium; *ha*, humeral angles.

2. Cephalic aspect of head of *Ceresa bubalus*. *es*, epicranial suture; *o*, ocellus; *v*, vertex; *e*, compound eye; *g*, gena; *lo*, lora; *cl*, clypeus; *l*, labrum; *ep*, epipharynx; *la*, labium.

3. Caudal aspect of head of *Ceresa bubalus*. *oc*, occiput; *of*, occipital foramen; *pg*, postgena; *e*, compound eye; *la*, labium.

4. Lateral aspect of head of *Ceresa bubalus*. *oc*, occiput; *v*, vertex; *e*, compound eye; *g*, gena; *cl*, clypeus; *pg*, postgena; *l*, labrum; *ep*, epipharynx; *mx*, maxillary stylets; *md*, mandibular stylets; *la*, labium.

5. Pronotum of *Ceresa bubalus*. *sp*, suprahumerals; *ha*, humeral angles; *m*, metopidium; *dc*, dorsal carina; *pp*, posterior process.

6. Metathoracic leg of *Ceresa bubalus*. *c*, coxa; *tr*, trochanter; *f*, femur; *t*, tibia; *ta*, tarsus.

7. Prothoracic leg of *Ceresa bubalus*.

8. Prothoracic leg of *Campylenchia latipes*.

9. Tegmen of *Ceresa bubalus*.

10. Hind wing of *Ceresa bubalus*.

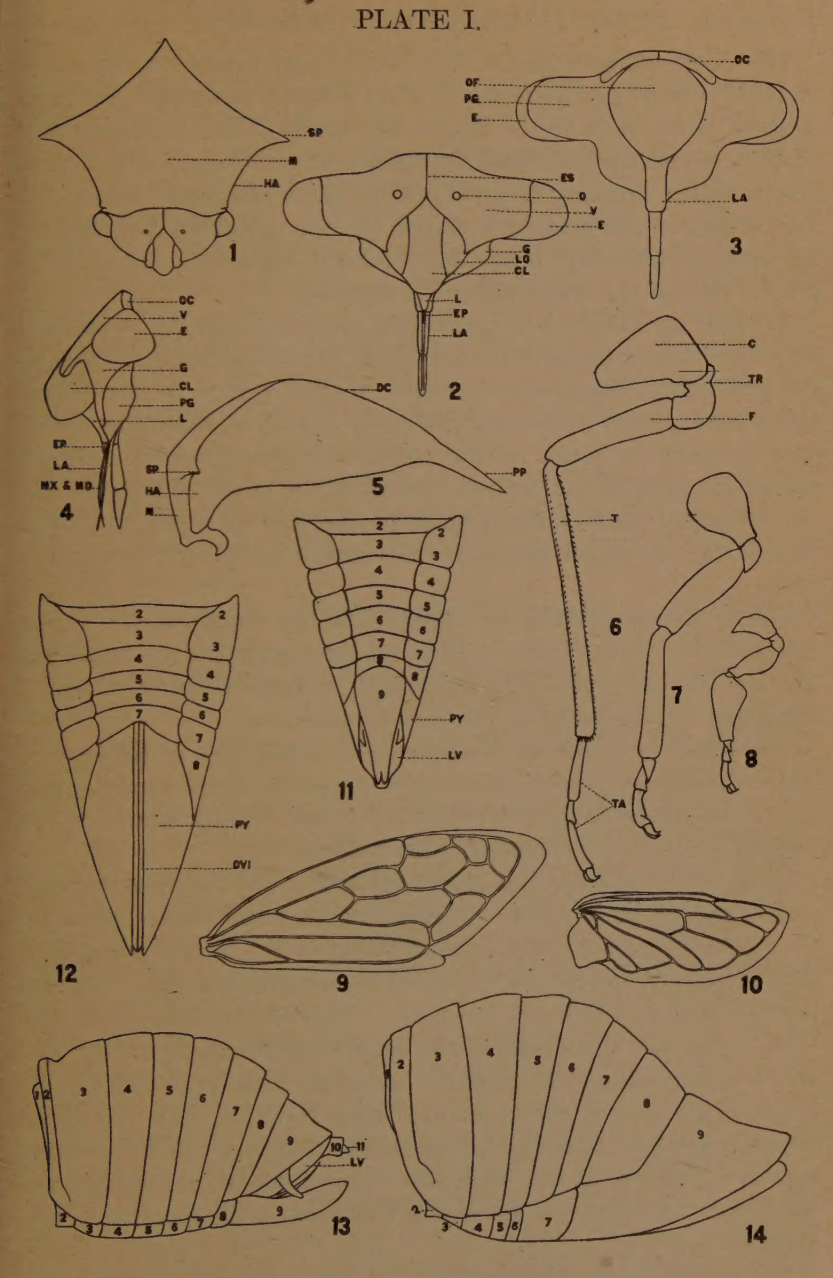
11. Ventral aspect of abdomen of male *Ceresa bubalus*. *2-9*, sternites; *2-8*, pleurites; *py*, pygofer or ninth tergite; *lv*, lateral valve.

12. Ventral aspect of abdomen of female *Ceresa bubalus*. *2-7*, sternites; *2-8*, pleurites; *pg*, pygofer or ninth tergite; *ovi*, ovipositor.

13. Lateral aspect of abdomen of male *Ceresa bubalus*. *1-11*, tergites; *2-9*, sternites; *lv*, lateral valve.

14. Lateral aspect of abdomen of female *Ceresa bubalus*. *1-9*, tergites; *2-7*, sternites.

PLATE I.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STRUCTURAL CHARACTERISTICS.

The outstanding characteristic of the membracids is their remarkably developed pronotum. This sclerite is usually enlarged so as to cover most of the thorax and much of the abdomen, and while in our species it is often extended into rather regularly formed processes, yet in many tropical species these processes assume the most irregular and grotesque shapes. In the subfamily Centrotinæ, however, the pronotum is not thus enlarged, but is so small that the greater part of the scutellum is left exposed.

As in all insects, the body is divided into three regions. The head is quite characteristically homopterous, fitting against the coxæ of the prothoracic legs, between which lies the beak. At its lateral extremities are the well-developed *compound eyes,* while the *simple eyes* or *ocelli* are found on the *vertex,* the paired sclerite forming the greater part of the cephalic aspect of the head. The ocelli are always paired and in a line with each other and the compound eyes, though their distance from each other and from the compound eyes varies.

The setaceous *antennæ* are found under the margin of the vertex on either side of the *clypeus.* The first three segments are large, but the rest of the organ is composed of a large number of small segments which decrease in size toward the apex.

The vertex is a paired sclerite lying on either side of the base of the Y-shaped *epicranial suture.* The presence of this suture would indicate a more primitive position for this family than for the Cicadellidæ, where no signs of it are present.

Between the arms of the epicranial suture and forming the apex of the head is the clypeus. This sclerite is often characteristic in the length of its apex and in its relation to the lateral margins of the vertex. At its apex it is turned backward, forming a rounded lobe, caudad of which are the *genæ.* The latter sclerites are seen to form the lateral portions of the head, extending between the eyes and the clypeus, and bearing the antennæ. The *postgenæ* occupy most of the caudal aspect of the head, forming, with the dorsal occipital sclerites or *occiput,* most of the boundary of the *occipital* foramen. The *loræ* are found on either side of the clypeus and labrum as two more or less distinct sclerites with rounded lateral margins.

The *beak* or *labium* consists of three segments, as in other Homoptera, and contains in a groove the *mandibular* and *maxillary*

stylets. The *labrum* is large and caudad of the clypeus, bearing the more or less membranous *epipharynx* at its tip. All the mouth parts are typical of the ordinary sucking phytophagous insect.

The thorax, as in all insects, consists of three segments. For our purposes only a brief discussion of the dorsal sclerite of the prothorax will be necessary. This sclerite, the *pronotum*, as already mentioned, is the chief characteristic of the family. It is one of the finest examples of the biological phenomenon of orthogenesis that is to be found. In our North American membracids it is comparatively simple as compared with its appearance in many Neotropical genera, such as *Sphongophorus* and *Cyphonia*. But even in our fauna it assumes such diverse forms as to give us the best generic, and often also specific characters for the classification of the members of this family. The following parts have been named and are used in the descriptions which follow:

1. *Metopidium*. The cephalic area of the pronotum, extending from the base of the head to the front of the dorsum.

2. *Humeral angles*. The angles of the pronotum just above the bases of the wings.

3. *Suprahumerals*. The lateral projections above the humeral angles.

4. *Dorsal carina*. The ridge usually extending the length of the pronotum.

5. *Posterior process*. The caudally directed portion of the pronotum.

The three segments of the thorax each bear a pair of legs, which are composed of the usual segments, the *tarsi* being three-segmented. The *coxæ* are usually stout, the *trochanters* rather small and bent, the *femora* large and stout, and the *tibiæ* usually long, slender and hairy. In the subfamily Membracinæ and in some Centrotinæ, the tibiæ are wide and flat or foliaceous, especially so in the prothoracic and mesothoracic legs.

The last two thoracic segments each bear a pair of wings, which are of value in systematic work, not only in their venation, but also in their relation to the pronotum.

The abdomen consists of eleven segments, the last two forming the anal tube. Most of these segments show a distinct tergite, pleurites and sternite. Of these sclerites the tergite is by far the largest, forming both the dorsal and lateral portions of the segment; and in the case of the female ninth segment, nearly inclosing the segment, coming clear down to the sides of the ovipositor, in

this sex there showing externally but six sternites, those of the second to seventh segments, inclusive. In the male the ninth tergite is not as large, for in this sex the sternites of segments two to nine, inclusive, all show clearly. This tergite bears, however, on either side, a pair of broad lobes or plates which Funkhouser calls the lateral valves. These, he thinks, may be the pleura of the ninth segment and of use in copulation. They may project caudad or turn mesad—a character of generic value. They frequently bear variously shaped processes or teeth, which, as far as the writer has observed, are constant in form and position for the various species, and are therefore good specific characters.

The sternite of the seventh segment of the female differs in different species, and is therefore of systematic value, as is also the ninth sternite or sternal plate of the male. The latter is constant in shape and extent of apical splitting within the species, and this makes it of value as a taxonomic character.

THE MALE GENITALIA.

As in the Cicadellidæ, the abdomen of the male ends in what Sharp calls the "terminal chamber" in the case of the Pentatomidæ. This chamber is bounded above by the anal tube and ninth tergite, laterally by the lateral valves, and ventrally by the ninth sternum. Within this chamber are found the genital organs of the male, their position and structure being exactly homologous with the male genitalia of the leaf hoppers.

The *styles* or *claspers* are always paired, both members of the pair being alike, and fastened to the sternal plate by apparently passing, near their middle, through the membrane forming the dorsal surface of the plate. The cephalic portion of the clasper projects into the abdominal cavity, frequently reaching the sixth segment, though usually extending only as far as the eighth or ninth. It does not seem to vary much in the different species. The apical portion, however, is characteristic in its shape and apical structure, sometimes being nearly straight, at other times more or less strongly curved, and ending either in a plain acute point or in variously shaped and toothed extremities. So far the writer has found no two species in which the styles are alike in both size and structure.

Canon Fowler, in the "Biologia Centrali-Americana," states that in the genus *Ceresa* the styles are long and pointed, while in the genus *Stictocephala* they are short and obtuse at the apex. This is undoubtedly frequently true, but the writer has found that it does

not always hold in the members of these genera as the latter are now constituted. Thus, while in *Stictocephala festina* the above-mentioned condition holds good, it is not true of *S. lutea,* for the latter possesses styles just as long and pointed as in several members of *Ceresa,* notably *C. bubalus.*

As in the Cicadellidæ, the styles are united by a small sclerite, which varies in shape in the various genera and species, but is always of the same shape within the species. This sclerite the writer has called the "*style-œdagus connective,*" or more simply, the "*connective.*" The former name shows its usual function in the leaf hoppers, for usually it unites not only the two styles, but at its distal end is united to the base of the œdagus. This condition prevails in all the tree hoppers thus far examined. Its relation to the styles, however, is apparently different in the two families, for in the leaf hoppers each style sends out a distinct chitinous process to which it is fastened, while in the tree hoppers this chitinous process is not usually present, but rather each style, at the point of attachment to the connective, gives off a dorsal membranous fold which unites with the connective, the two folds appearing heart-shaped basally when viewed from above.

In all the species so far examined the connective appears as a rather thin, usually flat sclerite, frequently showing a distinct tendency to fold longitudinally along a median keel, thus drawing the two styles closer together. It is usually quite small, but in some forms, notably *Ceresa borealis,* it is well developed.

The writer has not tried to determine the morphological status of the connective. Kornhauser calls it the ninth sternite. Funkhouser does not mention it, but feels that the last sternal plate or the valves are the ninth sternite. That it is a sternite cannot be doubted, and the writer hopes to discuss its exact position in a later paper on the genitalia of the Homoptera-Auchenorhynchi.

The *œdagus,* or *penis sheath,* seen laterally, is usually a V-shaped organ, the mouth of the V looking caudad or dorsad. The anterior or dorsal arm extends up to the base of the anal tube, the latter always being fastened to it, usually at a slight excision near its apex. As far as our present studies go, the shape of this arm seems to vary more or less even within the species, sometimes being rather narrow and straight, then changing till it is frequently quite broad and variously bent. The lower or posterior arm is the penis sheath proper. The penis enters it just above the usual basal angle by which the œdagus is united to the connective. This basal angle may

often be prolonged into a distinct cephalic process. This ventral arm varies greatly in different genera and species, but, as far as our observations go, is always constant in shape within the species. It usually extends more or less dorso-caudad, though sometimes its apex is bent distinctly dorsad and may even extend dorso-cephalad. The course of the penis through this arm is usually easy to trace in caustic potash specimens.

In the genera *Ceresa* and *Stictocephala* the functional orifice is usually along the ventral side of this arm and at quite a distance from the apex. This opening in these genera is usually quite long and is guarded by a distinct membranous external sheath. In *S. festina,* however, the penis opens apically, while in *Campylenchia, Telamona* and others it opens at or near the apex. In every case, however, the opening seems to be guarded by the external membrane and is constant in position within the species. The shape of the apex also is constant for the species; in fact, the whole organ seems to afford an excellent specific character for use in systematic work. Canon Fowler's characterization of the œdagus of *Stictocephala* does not hold good for all the species of the genus.

The cephalic portion of the styles and the dorsal arm of the œdagus are practically internal parts. It seems as though these parts have distinct layers added to them at various intervals, thus adding to the length of the former and to the width of the latter This may account for the variable condition seen in these organs, even within the species. The terminal portions, however, seem to be constant.

The *sternal plate,* both as to shape and the extent of its division into two parts, is an excellent and readily available character for taxonomic work. It may be the ninth sternite, but the question as to its possible homology with abdominal appendages at once arises. At any rate, it seems to be exactly homologous with the *plates* of the Cicadellidæ.

Further work with these genital organs will undoubtedly lead to their greater use in systematic work. The writer has found that specimens identified as identical can frequently be separated and properly classified by a study of these organs. It is to be hoped that the various genera will be studied from this standpoint in the days to come. If they are the writer feels that several generic changes will be made. Thus it would seem that the genus *Stictocephala* should be divided, for the genitalia of *S. festina* and *S. lutea* cannot possibly belong to members of the same genus. On the other hand,

the genitalia of the genera *Telamona* and *Telonaca* are so near alike that it seems certain that the latter should never have been separated from the former.

PHYLOGENY OF THE FAMILY.

The membracids belong to that group of the Homoptera known as the Auchenorhynchi, which differs from the rest of the members of the order, the Sternorhynchi, in that in the latter the mouth parts seemingly arise from between the prothoracic legs, instead of from the head, as in the former.

In this group are five families, arising from three different stems, of which it seems clear that the Cicadidæ arise from the lowest stem and the Fulgoridæ from the highest. In between these two families are the closely related membracids, cicadellids and cercopids. As pointed out in his paper on the Cicadellidæ of Kansas, the writer accepts the conclusions of Funkhouser and others in making the membracids the lowest of these three families and the cercopids the highest. This relationship would therefore be expressed as follows:

In the above figure it will be noticed that the Cercopidæ are represented as branching off earlier from the median stem than the other two families. This seems evident when their life history is considered, for they have been isolated long enough to enable them to perfect a method of protection against parasitism. Certainly the development of the production of the spittle mass which incloses the nymph could not have occurred quickly, but must have taken a relatively long period of time to attain its present perfection.

LIFE HISTORY.

Most of the members of this family occur on small trees or shrubs, particularly those growing near the edges of woods or out in the open. In the main they seem to avoid the shade and prefer those

situations where they receive the most sunshine. Most of our species occur on trees, but there are several that are found on shrubs, and some occur on weeds, grasses and clovers.

The majority of our species of tree hoppers are found to overwinter in the egg stage. This stage, therefore, occupies by far the longest period in the life history of the insect. The eggs are deposited for the most part in the twigs. Here they may be placed in simple incisions in a row, or the well-known method of oviposition of *Ceresa bubalus* may be used where two curved incisions, facing each other, are made. Some species also oviposit in the buds, while our common *Entylia concisa* lays its eggs in the veins of the leaf of *Ambrosia trifida.* Funkhouser gives the axils of the leaves as the place where *Telamona ampelopsidis* oviposits, while *Thelia bimaculata* lays most of its eggs in the roots or on the stem below the surface of the soil.

While most of our treehoppers hibernate in the egg stage, Funkhouser states that *Entylia bactriana* and *Publilia concava* overwinter as adults. The writer has taken *Entylia concisa* late in the fall in the rubbish and grass around its host plant. In fact, on September 8 he has found the eggs of this species just hatching, while on September 11 he has taken all the nymphal instars and newly matured adults on a single leaf.

The number of generations in a season is usually one, by far the larger number of our species having a single annual brood. Some species, however, have two broods and some probably three, while *Vanduzea arquata* is said by Funkhouser to have as many as four generations. The same is seemingly true of our *Vanduzea triguttata.*

The usual life history of a tree hopper has been summarized by Doctor Funkhouser as follows:

Eggs: Laid in fall, hatch in early spring.

Nymphs: Emerge about the middle of May and require about six weeks to reach maturity.

Adults: Are common about July 1 and persist throughout summer and fall.

Mating: Takes place the first week after emergence.

Oviposition: Occurs within a week after mating.

Broods: Usually one but sometimes more, dependent on weather conditions.

For a single individual the life cycle would be somewhat as follows:

Egg stage: From September to middle of May	8½	months
First instar	1	week
Second instar	1	week
Third instar	1	week
Fourth instar	1	week
Fifth instar	2	weeks
Nymph:		
Total, from middle of May to July	1½	months
Adult: From July to October (inclusive)	4	months
Entire life	14	months

The above dates of course apply to New York and would differ somewhat from what occurs in Kansas.

One of the easiest ways to find certain species of tree hoppers is to notice the more readily seen ants which attend so many of our common forms. In this way *Vanduzea triguttata* and *Entylia concisa* are very easily located. It is well known that the ants obtain honey dew from these insects, although there are many species of tree hoppers which do not seem to furnish this substance in sufficient quantity to attract the attention of these visitors.

It is well known that these insects are frequently parasitized. Hymenopterous parasites of the family Dryinidae have been known to occur in several genera of tree hoppers. Doctor Kornhauser worked out in great detail the life history of such a parasite, *Aphelopus theliæ,* which parasitizes *Thelia bimaculata.* In addition, tree hoppers are often the prey of predaceous insects and spiders. Of such predaceous enemies there are a number of kinds, but it is quite doubtful if these enemies are a very vital factor in the natural control of the members of this family.

ECONOMIC IMPORTANCE.

The chief damage done by tree hoppers is by their oviposition. The records of injury to young orchards, especially to apple, are many. The type of oviposition that may really be serious is that represented by the egg punctures of *Ceresa bubalus,* and this species is seemingly the most often accused of all the species concerned. The writer has seen young orchards in which the outer twigs were all roughened up by the oviposition scars, and such cases are numerous in the literature. The exact damage done, however, is problematical, many inclining to the opinion that as a rule the damage done is not serious. Others hold that in after years such scars will weaken the branches, causing them to be more easily broken off by the wind, and also furnishing good points of attack for borers. The

wounds made also doubtless furnish good points of entrance for certain fungous diseases.

Cases are on record also where the buds of certain trees were seriously injured by the deposition of eggs within them. Damage from such oviposition always results when eggs are deposited deeply in small buds. In this respect the species concerned most frequently are *Ceresa taurina, Stictocephala inermis* and *Enchenopa binotata*. The species most injurious to stems belong to the genera *Ceresa* and *Stictocephala.*

Inasmuch as the nymphs of the most injurious species prefer to feed on the more succulent weeds and grasses in the orchard, the clean culture of badly infested orchards and the getting rid of near-by weed patches in the early summer, will usually be all the control measures necessary. Frequently in case of very severe infestations the careful pruning of the worst-infested twigs after egg deposition is a desirable practice.

LIST OF THE SPECIES.

Microcentrus caryæ (Fitch).
Campylenchia latipes (Say).
Enchenopa binotata (Say).
Ceresa diceros (Say).
Ceresa albescens Van D.
Ceresa bubalus (Fabr.)
Ceresa taurina Fitch.
Ceresa palmeri Van D.
Ceresa borealis Fairm.
Ceresa brevicornis Fitch.
Stictocephala inermis (Fabr.)
Stictocephala festina (Say).
Stictocephala lutea (Walk.).
Acutalis tartarea (Say).
Micrutalis calva (Say).
Carynota mera (Say).
Thelia bimaculata (Fabr.).
Thelia uhleri Stal.
Glossonotus acuminatus (Fabr.)
Heliria cristata (Fairm.).
Heliria scalaris (Fairm.).
Telamona pyramidata (Uhl.).
Telamona viridia Ball.
Telamona obsoleta Ball.
Telamona decorata Ball.
Telamona querci Fitch.
Telamona ampelopsidis (Harr.).
Telamona tristis Fitch.
Telamona unicolor Fitch.
Telamona extrema Ball.
Telamona collina (Walk.).
Telamonanthe rileyi (Godg.).
Telamonanthe modesta (Godg.).
Archasia galeata (Fabr.).
Archasia belfragei Stal.
Smilia camelus (Fabr.).
Cyrtolobus celsus Van D.
Cyrtolobus fuliginosus (Emns.).
Cyrtolobus arcuatus (Emns.).
Cyrtolobus fenestratus (Fitch).
Cyrtolobus tuberosus (Fairm.).
Cyrtolobus vau (Say).
Cyrtolobus griseus Van D.
Cyrtolobus cinereus (Emns.).
Cyrtolobus querci (Fitch).
Cyrtolobus muticus (Fabr.).
Ophiderma salamandra Fairm.
Ophiderma flaviguttula Godg.
Ophiderma flava Godg.
Vanduzea triguttata (Burm.).
Entylia concisa Walk.
Publilia concava (Say).
Publilia modesta Uhl.
Publilia reticulata Uhl.

SYSTEMATIC TREATMENT OF KANSAS SPECIES.

The three subfamilies represented in Kansas may be separated by the following key:

KEY TO SUBFAMILIES.

A. Scutellum distinct, not concealed by the pronotum. Centrotinæ.
AA. Scutellum wanting or concealed by the pronotum.
  B. Tibiæ, especially anterior ones, foliaceous. Membracinæ.
  BB. Tibiæ not foliaceous. Smiliinæ.

SUBFAMILY CENTROTINÆ (Spinola).

This subfamily, represented in the United States by about half a dozen genera and a few more species, is readily separated from the other subfamilies by the presence of a usually visible scutellum. The genus *Microcentrus* occurs in Kansas.

GENUS MICROCENTRUS (Stal).

The members of this genus that occur in the United States have a pronotum that leaves a large part of the scutellum well exposed and ends in a slender terminal process which extends beyond the divided apex of the scutellum.

Both members of this genus known to occur in the United States have been taken in Kansas. They may be separated by the following key:

KEY TO SPECIES.

A. Prothorax bearing a pair of laterally flattened horns. *perdita.*
AA. Prothorax without laterally flattened horns. *caryæ.*

Microcentrus caryæ (Fitch).

Uroxiphus caryæ Fitch, Homop. N. Y. St. Cab., p. 52, 1851.
Centrotus caryæ Walker, List Homop., iv, p. 1147, 1851.
Microcentrus caryæ Stal, Of. Vet. Akad. Forh., xvi, p. 295, 1869.
Phaulocentrus caryæ Fowler, Biol. Centr. Am., Homop., ii, p. 159, 1896.

Funkhouser gives the following technical description:

Gray-brown mottled with black; entire body broad and flat; pronotum roundly swollen above line of abdomen and wings; wings broadly tectiform.

Head perpendicular, twice as broad as long, roughly sculptured, closely punctate, densely pubescent, deep brown at base; eyes prominent, extending beyond lateral margins of pronotum, dark brown margined with lighter; ocelli small, pearly, farther from the eyes than from each other, with deep depression between them; clypeus prominent, broad, lighter in color than vertex above, extending far below lateral margin of head.

Prothorax subspherical, with high median carina, coarsely punctate, pubescent; light brown marked with black on median ridge and above head; posterior margin truncate except for narrow process, which projects to angles of

tegmina and short sharp tooth on each latero-posterior angle. Scutellum broadly exposed, wide at base, truncate at tip, which does not reach apex of posterior process.

Tegmina translucent, pubescent, inner margins straight and meeting at median dorsal line; veins prominent and nodulate; apices of tegmina extending beyond tip of abdomen. Legs and undersurface of body light brown mottled with white. Undersurface of abdomen often tomentose.

Length, 9-10 mm.; with, 3 mm.

Distribution. Van Duzee records this species from Ontario, New York, New Jersey, Pennsylvania, North Carolina and Ohio. In the Crevecoeur collection is a specimen taken in Pottawatomie county, Kansas, thus establishing its occurrence in the state.

Hosts. As indicated by the specific name, this species occurs on hickory. Funkhouser reports it on oak also. Matausch gives swamp oak and walnut, and Goding mentions the latter.

Microcentrus perdita (Amyot & Serville).

Ledra perdita Amyot & Serville, Hemip., p. 577, pl. 11, fig. 5, 1843.
Centruchus leibecki Goding, Ill. St. Lab. Nat. Hist., iii, p. 471, 1894.
Microcentrus perdita Baker, Can. Ent., xxix, p. 38, 1897.
Centruchoides perdita Van Duzee, Bul. Buf. Soc. Nat. Sci., ix, p. 117, 1908.

Goding describes this species as follows:

Yellow-ferruginous, silky white between lateral horns; behind horns a spot on costal margin, near base of tegmina. Head black, broad, eyes very prominent; base convex, griseous, lower part of face strongly declivous; four roughened carinæ pass along face from base downward, the ocelli being in the two internal ones, the outer ones being contiguous to the eyes; part of face below eyes triangular, apex yellow. Ocelli equidistant from each other and the eyes. Prothorax convex, lateral angles slightly produced, a prominent median carina extending from base to apex nearly black. Above the lateral angles, on each side, is a long horn or protuberance, flattened laterally, slightly curving upward, outward and forward, the apex truncated; width of base and apex equal. Apex of scutellum bidentate, the teeth ivory-white; posterior margin of prothorax with a very slender tooth or style, extending backward on each side of posterior process of prothorax, a little distant from it. The entire surface of the prothorax densely and regularly punctured. Apex of tegmina far surpassing tip of abdomen; a black spot on the internal margin a short distance from the apex; another black spot on the costa, about one-third the distance from the base. Tarsi black; legs mottled with ferruginous and grayish-yellow; tibiæ triquetrous. Tegmina lightly ferruginous and opaque.

Length to apex of tegmina, 8.5: mm.; width at lateral angles, 3.2 mm.

Distribution. Reported from Massachusetts, New Jersey, Pennsylvania, Florida, Colorado and New Mexico. Specimens have also been taken in Riley county, Kansas.

Hosts. Van Duzee reports this species from scrub oak.

SUBFAMILY MEMBRACINÆ (Stal).

The members of this subfamily differ from all other membracids of our fauna by having the prothoracic and mesothoracic tibiæ foliaceous. As in the following subfamily, the pronotum conceals the scutellum.

Two genera occur in Kansas which may be separated by the following key:

KEY TO GENERA.

A. Lateral ridges of anterior horn nearer dorsal carina; ventral carina of horn not distinctly foliaceous. *Campylenchia.*

AA. Lateral ridges of anterior horn midway between dorsal and ventral carinæ; latter distinctly foliaceous. *Enchenopa.*

GENUS CAMPYLENCHIA (Stal).

This genus, the chief characteristics of which appear in the above key, is represented by a single though widely spread species in the United States.

Campylenchia latipes (Say).

(Pl. VI, figs, 9, 10.)

Membracis latipes Say, Long's 2nd Exped., ii, p. 302, 1824; Compl. Writ., i, p. 202.
Enchophyllum latipes Fitch, Homop. N. Y. St. Cab., p. 47, 1851.
Enchenopa latipes Walker, List Homop., ii, p. 482, 1851.
Enchenopa antonina Walker, List Homop., ii, p. 488, 1851.
Enchenopa venosa Walker, List Homop., ii, p. 488, 1851.
Enchenopa frigida Walker, List Homop., ii, p. 490, 1851.
Enchenopa bimacula Walker, List Homop., ii, p. 491, 1851.
Campylenchia curvata Stal, Hemip. Fabr., ii, p. 43, 1869.
Enchenopa curvata Uhler, Bul. U. S. Geol. Geog. Surv., i, p. 343, 1876; iii, p. 457, 1877.
Aconophora curvata Butler, Cist. Ent., ii, p. 349, 1877.
Echenopa rectidorsum Buckton, Monog. Membr., p. 49, 1903.
Campylenchia latipes Van Duzee, Can. Ent., xliv, p. 326, 1912.

Funkhouser gives the following technical description:

Uniform cinnamon brown, densely punctate, sparingly pubescent; single porrect pronotal horn projecting forward over head; head and first two pairs of legs broadly foliaceous, hind legs spined; tegmina opaque, punctate at basal and costal margins.

Head quadrate, somewhat declined, shining brown somewhat mottled with darker, lightly punctate, densely pubsecent; eyes prominent; ocelli small, pearly, equidistant from each other and from the eyes and situated on a line passing through centers of eyes; clypeus very broad, shining, scarcely punctate, broadly truncate at apex, tip strongly pubescent.

Prothorax produced anteriorly into a long, flattened horn, ridged in center and foliaceous above and below, varying greatly in length and degree of curve; posterior process strong, tectiform, reaching internal angles of tegmina; median dorsal carina strong and percurrent; entire pronotum concolorous, lightly punctate, sparingly pubescent with golden hairs; median lateral ridge reaching lateral margin.

Tegmina yellow-opaque; basal and costal areas punctate and pubescent;

veins distinct, broad, and slightly pubescent; five apical and two discoidal cells; hind wings iridescent. Two anterior pairs of legs broadly spatulate and lightly pubescent at margins; posterior tibiæ armed with black-tipped spines; tarsi much produced and lighter in color. Undersurface of body chocolate brown.

Length: from head to apices of elytra, 5 mm.; from tip of promotal horn to apices of elytra, 8 mm. Width between humeral angles, 2 mm.

Internal male genitalia. Styles with long flattened anterior process, widest apically, with a distinct prominence at attachment to connective, caudad of which they are peculiarly wrinkled and show a small but distinct mesal lobe, then widest just caudad of wrinkled portion, after which they curve laterad, ending in a doubly pointed apex, of which the terminal tooth is larger and more slender than the anterior one, the apical third of the styles bearing a few short hairs; connective short and wide, basal half with a heavily chitinized and flattened V-shaped portion; œdagus, viewed laterally, stout and broadly V-shaped, widest at the distinctly notched base, the upper basal process also slightly notched, narrowest at the bend and then widening till near the apex, the caudo-dorsal portion of which is only slightly chitinized, the functional orifice being at about the middle of this slightly chitinized area, the upper portion of the apex bearing a few distinct file-like teeth.

Distribution. Van Duzee gives the following distribution for this species: Ontario, Maine, Vermont, New York, New Jersey, Pennsylvania, North Carolina, Illinois, Iowa, Kansas, Missouri, Colorado, Wyoming, Montana, Texas, New Mexico, Arizona, and California. Osborn reports it from Florida. It is thus seen to extend throughout the United States.

In Kansas specimens have been taken in the following counties: Douglas, Ottawa, Pratt, Hodgeman, Clark, Pottawatomie, Labette, Bourbon, Wabaunsee, Russell, Riley, Ellis, Ellsworth and Wyandotte.

Hosts. Funkhouser gives the following hosts for this species: Aster, daisy, joe-pye weed, alfalfa, prickly lettuce, wild carrot. Miss Branch mentions golden rod and sensitive rose. Gillette and Baker report it from *Glycyrrhiza lepidota, Psoralea tenuiflora* and *Apocynum androsaemifolium.* The writer has found it very abundantly on alfalfa.

GENUS ENCHENOPA Amyót & Serville.

But two members of this genus are known to occur in the United States. The widely distributed *E. binotata* occurs in Kansas.

Enchenopa binotata (Say).

(Pl. VI, figs. 11, 12.)

Membracis binotata Say, Long's 2nd Exped., ii, p. 301, 1824; Compl. Writ., 1, p. 201.
Enchophyllum binotatum Fitch, Homop. N. Y. St. Cab., p. 47, 1851.
Enchenopa binotata Walker, List Homop., ii, p. 481, 1851.
Enchenopa brevis Walker, List Homop., ii, p. 492, 1851.
Thelia binotata Emmons, Nat. Hist. N. Y. Ins., p. 156, 1854.
Enchenopa bifusifera Walker, List Homop., Suppl., p. 125, 1858.
Enchenopa bivittata Rathvon in Mombert's Hist. Lanc. Co., Pa., p. 551, 1869.
Enchenopa porrecta Buckton, Monog. Membr., p. 51, pl. 6, fig. 5, 1902.

Funkhouser gives the following technical description:

Much resembling the preceding species in size and in general appearance, but differing in shape of the head, in shape of sculpturing of the pronotal horn, and in bearing two yellow spots on the dorsal line of the pronotum.

Head longer than broad, uniform brown, finely but densely punctate, sparingly pubescent; eyes prominent, very deep brown; ocelli yellowish, farther from each other than from the eyes; clypeus longer than broad, rounded at tip, not punctate.

Prothorax finely punctate, sparsely pubescent; two distinct ridges on each side, the upper extending to the lateral margin; pronotal horn strongly curved, broadly foliaceous above, triquerate at tip; median dorsal carina high and percurrent; two dorsal spots of lemon yellow, the anterior about twice as long as the posterior; posterior process gradually acuminate, extending slightly beyond internal angles of tegmina.

Tegmina concolorous brown, opaque, costal margins slightly punctate, and feebly pubescent at base; veins distinct; five apical and one discoidal cell. First two pairs of legs broadly foliaceous; hind tibiæ spined; tarsi thin.

Length 5 mm.; width 2 mm.

Internal male genitalia. Styles stout, anterior portion longer and broader than posterior, with a rounded prominence to connective, wider just caudad of this, apices strongly hooked and truncate, the apical point being slightly longer than the anterior one, with a few hairs on the terminal third; connective heart-shaped, broad, a basal V-shaped band heavily chitinized; œdagus, viewed laterally, strongly curved, base very wide and extending dorsad in a large rounded prominence which is separated by a broad notch from the pointed attachment to the connective, the apex pointed and with functional orifice below the tip, the dorsal surface of which bears a number of filelike teeth.

Distribution. Van Duzee reports this species from Ontario, Massachusetts, New Hampshire, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, North Carolina, Florida, Illinois, Iowa, Michigan, Kansas, Missouri and Texas. In Kansas specimens are reported from Douglas, Riley, Sedgwick, Bourbon and Pottawatomie counties.

Fowler records it from Mexico, Guatemala and Panama. It is thus seen to occur throughout the eastern United States and down through Central America.

Hosts. Funkhouser gives the following hosts: Locust, wild grape, bittersweet, hickory, sycamore, butternut, dogwood, daisy, joe-pye weed. Miss Branch adds golden rod and pin oak. Matausch gives *Viburnum.* Goding records it from butternut, birch, apple, walnut, grape, hop tree, locust, redbud, cherry, *Viburnum, Ceanothus* and white birch. The writer has taken it chiefly on locust, *Ceanothus* and walnut.

SUBFAMILY SMILIINÆ (Stal).

This subfamily includes all but the three preceding members of our fauna. In all of them the pronotum conceals the scutellum and the tibiæ are not foliaceous. The seventeen genera occurring in Kansas may be separated by the following key:

KEY TO GENERA.

A. Tegmina entirely free, not covered by pronotum.
  B. Veins of corium closely united at base.
    C. Suprahumeral horns present. *Ceresa.*
    CC. Suprahumeral horns absent. *Stictocephala.*
  BB. Veins of corium widely separated at base.
    C. Tegmina with five apical cells; veins distinct. *Acutalis.*
    CC. Tegmina with four apical cells; veins indistinct. *Micrutalis.*
AA. Tegmina partly or entirely covered by pronotum.
  B. Terminal cell of hind wing sessile, its base truncate.
    C. Pronotum without horn or crest.
      D. Dorsum low and rounded. *Carynota.*
      DD. Dorsum high, compressed, and foliaceous. *Archasia.*
    CC. Pronotum with horn or crest.
      D. Horn anterior and porrect. *Thelia.*
      DD. Horn a flat dorsal crest.
        E. Crest arising from between humeral angles. *Glossonotus.*
        EE. Crest arising from behind humeral angles.
          F. Crest strongly step-shaped. *Heliria.*
          FF. Crest sometimes slightly, but not usually step-shaped.
            G. Basal costal cell of tegmina not entirely punctate. *Telamona.*
            GG. Basal costal cell of tegmina entirely punctate. *Telamonanthe.*
  BB. Terminal cell of hind wing triangular and petiolate.
    C. Base of corium with three veins.
      D. Corium without cross-veins at base. *Smilia.*
      DD. Corium with cross-veins at base.
        E. Dorsum strongly compressed. *Cyrtolobus.*
        EE. Dorsum rounded. *Ophiderma.*

CC. Base of corium with two veins.
D. Apical cell of tegmina transverse. *Vanduzea.*
DD. Apical cell of tegmina triangular.
E. Dorsum strongly elevated, with deep median notch. *Entylia.*
EE. Dorsum slightly elevated, with weak median depression. *Publilia.*

GENUS CERESA Amyot & Serville.

To this genus belong our commonest species, most of which are green and all of which are at once recognized by their prominent suprahumeral horns.

The seven species known to occur in Kansas may be separated by the following key:

KEY TO SPECIES.

A. Species brown.
B. Species larger and very hairy; suprahumerals not recurved; one white band on posterior process. *diceros.*
BB. Species smaller, with few hairs; suprahumerals recurved; two white bands on posterior process. *albescens.*
AA. Species green.
B. Dorsal crest marked with brown or reddish.
C. Suprahumerals short and slightly recurved. *palmeri.*
CC. Suprahumerals longer and strongly recurved. *constans.*
BB. Dorsal crest concolorous.
C. Species small, 7-8 mm. long.
D. Very hairy species. *borealis.*
DD. Sparsely haired species. *brevicornis.*
CC. Species large, 8-10 mm. long.
D. Suprahumerals long, sloping upward and recurved; clypeus much produced beyond vertex. *taurina.*
DD. Suprahumerals stout, nearly straight, clypeus short. *bubalus.*

Ceresa diceros (Say).

(Pl. III, figs. 1, 2.)

Membracis diceros Say, Long's 2nd Exped., ii, p. 299, 1824; Compl. Writ., i, p. 199.
Smilia diceros Germar, Silb. Rev. Ent., iii, p. 237, 1835.
Ceresa postfasciata Amyot & Serville, Hem., p. 540, pl. 10, fig. 3, 1843.
Ceresa diceros Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 285, 1846.
Ceresa vitidalis Buckton, Monog. Membr., p. 172, pl. 36, figs. 3-3b, 1903.

Funkhouser gives the following technical description:

Dark brown with transverse bands of yellowish white; suprahumeral horns stout and blunt; posterior process decurved; tegmina smoky hyaline.

Head broader than long, sculptured, basal part strongly and smoothly curved, front surface light yellow faintly marked with brown, faintly longitudinally ridged, very slightly or not at all punctate or pubescent; eyes prominent, extending beyond adjoining lateral margin or pronotum; ocelli shining, transparent, nearer to each other than to the eyes; sclerites of front

projecting over clypeus at internal angles with a small hook; clypeus strong, swollen, roughly three-lobed, the central lobe the largest, tips strongly hirsute.

Pronotum densely and coarsely punctate; anterior surface slightly convex, light yellow with numerous brown markings, sparingly pubescent with rather long hairs; suprahumeral horns projecting outward and very slightly backward; lateral surfaces not pubescent, brown with two transverse light bands, the anterior broad and irregular in about center, the posterior narrower and regular just before apex of posterior process; posterior process gradually acute, extending beyond internal angles of tegmina.

Tegmina hyaline, tips smoky, bases opaque and lightly punctate; five apical and three discoidal cells. Undersurface of body very dark brown. Femora dark brown above; tibiæ and tarsi ferruginous.

Length, 9 mm.; width between humeral horns, 5.5 mm.

Internal male genitalia. Styles stout, varying much in the length of the cephalic part which, at its greatest length, is shorter than the part caudad of the connective, the sharply pointed caudal portion bearing two rows of long hairs; connective longitudinally keeled, when open nearly twice as long as wide, base concave, apex narrowed but obtuse; œdagus, viewed laterally, much as in *Ceresa bubalus*, but with dorsal process usually more pointed apically and the ventral process distinctly narrower and more acute apically.

Distribution: Van Duzee reports this species from Nova Scotia, Ontario, New York, New Jersey, Pennsylvania, Maryland, North Carolina, Ohio, Illinois, Iowa, Kansas, Missouri, Dakota, Colorado, Texas, New Mexico and Montana. It is therefore one of our most widely distributed species. In Kansas specimens have been taken in Douglas, Miami, Neosho, Bourbon, Pottawatomie, Riley, Shawnee and Saline counties.

Hosts: The usual host for this species is elderberry. Funkhouser gives the following additional hosts: Locust, oak, sycamore, sweet clover, blackberry and butternut.

Ceresa albescens Van Duzee.

Ceresa albescens Van Duzee, Bul. Buf. Soc. Nat. Sci., ix, p. 35, 1908.
Ceresa bubalus var. *a* and *b* Fitch, Homop. N. Y. St. Cab., p. 50, 1851.

The following is the original description:

A little smaller and paler than *diceros*, to which it is closely allied. Pronotum as in *diceros*, but with the suprahumeral horns more acute and recurved and tipped with black, and the apex longer and more slender. Face, front and superior surface of the pronotum greenish- or yellowish-white with scarcely a trace of the maculations found in *diceros;* apex of the head less produced, the tylus scarcely longer than the cheeks. Sides of the pronotum paler, ferruginous, becoming somewhat fuscous posteriorly, irrorate with paler and marked with a pale marginal line and sometimes with an oblique median vitta; protracted apex whitish with a black tip and ferruginous median vitta; outer surface of the suprahumerals dark ferruginous, differentiated from the

ferruginous sides by the pale lateral line which nearly attains the apex of the horns. Legs and beneath ferruginous, the femora darker. Last ventral segment of the female a very little oblique and rounded to the median notch, which is triangular, acute, and reaches the middle of the segment. Plates of the male not attaining the apex of the anal tube. Elytra almost hyaline, not smoky brown as in *diceros*, nervures ferruginous. Length, 8-9 mm.

Distribution. Van Duzee reports this species from Ontario, New York, and Kansas. Matausch took specimens in New Jersey. The Kansas specimens were taken at Effingham, Atchison county.

Hosts. Matausch gives *Viburnum* as a host.

Ceresa palmeri Van Duzee.

(Pl. III, figs. 3, 4.)

Ceresa palmeri Van Duzee, Can. Ent., xl, p. 114, 1908.

Funkhouser gives the following technical description:

Near *Ceresa constans*, but differing particularly in shape of the suprahumeral horns, which are short, terete, and but little recurved; small, reddish species, with pronotum rather high, not pubescent.

Head wider than long, yellowish, only faintly sculptured, not punctate; eyes prominent, reddish with white borders, extending beyond adjoining lateral margins of pronotum; ocelli not prominent, pearly with reddish margins, nearer to each other than to the eyes; clypeus continuing lateral margin of face, swollen and pubescent at tip.

Pronotum yellow-green, very strongly marked with brown and reddish; dorsal crest curved, strongly marked with red; lateral semicircular impression faint, area within it lighter in color than surrounding pronotum; posterior process slightly curved downward, about reaching tip of abdomen but not extending halfway to extremities of tegmina.

Tegmina hyaline, wrinkled, bases slightly punctate. Undersurface of body yellowish. Legs concolorous yellow-green in life, fading to pale yellow in cabinet specimens.

Length, 8 mm.; width, 3.5 mm.

Internal male genitalia. Styles large and stout, widest just caudad of attachment to connective, then broad until suddenly narrowed to the acute apex, caudal third with a fringe of long hairs extending nearly to the apex on the outer margin, but stopping considerably cephalad of the apex mesally; connective elongate heart-shaped; œdagus, viewed laterally, with dorsal process of medium width, ventral process more heavily chitinized and quite stout until near the quite acute apex, the membrane guarding the functional orifice large and about midway between the base and apex of the process.

Distribution. Van Duzee reports this species from Ontario, New York and North Carolina. Specimens have been taken in Kansas in Linn, Bourbon, Hodgeman and Cowley counties.

Hosts. Funkhouser gives young hickory as a host, while Metausch took numerous nymphs of the species from *Liquidambar*.

Ceresa constans (Walker).

Thelia constans Walker, List Homop., ii, p. 563, 1851.
Ceresa constans Stal, Of. Vet. Akad. Forh., xxvi, p. 245, 1869.
Ceresa subulata Provancher, Pet. Faune Ent. Can., iii, p. 338, 1890.
Ceresa illinoiensis Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 404, 1894.

Funkhouser gives the following technical description:

Small and distinctly reddish; dorsal crest low, median lateral line red; metopidium convex; horns sharp and much recurved; posterior process nearly straight, usually tipped with red; head triangular; tegmina and wings hyaline.

Head subtriangular, weakly sculptured, faintly longitudinally furrowed, very finely and lightly punctate, not pubescent; eyes prominent, dark brown with lighter edges, extending beyond adjoining lateral margins of pronotum; ocelli glassy, nearer to each other than to the eyes; clypeus much longer than wide, extending for more than half its length beyond lateral margin of face, tip hirsute.

Pronotum deeply and coarsely punctate, not pubescent, median carina prominent; dorsal crest low, rising but little higher than tips of suprahumeral horns; horns slender, sharp, much recurved, extending upward and curving backward; metopidium convex, regular; lateral semicircular impression deep, concolorous; posterior process nearly straight, not reaching the extremity of the abdomen and reaching barely one-third the distance to the tips of the tegmina.

Tegmina hyaline. Undersurface of body and legs yellowish.

Length, 8 mm.; width, 4 mm.

Distribution. Van Duzee reports this species from Ontario, New York, North Carolina and Illinois. Specimens have also been taken in Riley county, Kansas.

Hosts. Funkhouser gives locust as the host.

Ceresa borealis Fairmaire.

(Pl. III, figs. 7, 8.)

Ceresa borealis Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 284, 1846.

Funkhouser gives the following technical description:

Resembling *C. bubalus* in general outline, but much smaller and very hairy; metopidium convex; dorsum curved, posterior process only slightly decurved; head impunctate; notch of last ventral segment of female broad and triangular.

Head broader than long, yellowish, roughly sculptured, faintly longitudinally striate, not punctured nor pubescent; eyes prominent, mottled with green and brown, extending beyond adjoining lateral margins of pronotum; ocelli small, reddish, much nearer to each other than to the eyes; clypeus rounded, somewhat protruding, extending for more than half its length below lateral margin of face, tip hirsute.

Pronotum green, finely, deeply and densely punctate, very hairy; metopidium convex; median carina faint; suprahumeral horns stout, blunt, nearly

straight, projecting almost directly outward; dorsal crest regularly arcuate; lateral semicircular impression nearly obsolete; posterior process curving slightly downward, not extending beyond tip of abdomen and reaching only for a short distance beyond internal angles of tegmina.

Tegmina entirely hyaline, somewhat wrinkled, bases lightly punctate. Legs and undersurfaces of body concolorous greenish.

Length, 8 mm.; width, 4 mm.

Internal male genitalia. Style very large when compared with the other members of the genus, anterior process short, a small but distinct knob to the connective, posterior portion extending straight until considerably past the connective, then bending rather abruptly laterad and ending in a tip that on its mesal margin bears a number of small but distinct teeth; connective very long and rather slender, notched at base; œdagus, viewed laterally, small, with dorsal process strongly humped, the ventral process with basal knob, then tapering regularly to acute tip, membrane around functional orifice at middle third.

Distribution. Van Duzee records this species from Ontario, New York, New Jersey, Pennsylvania, North Carolina, Ohio, Kansas, Colorado, and Utah. In Kansas specimens have been taken in the following counties: Cowley, Sumner, Bourbon, Cherokee, Chautauqua, Douglas, Riley, Shawnee, Crawford, Miami, Linn, Neosho, Rawlins, and Ottawa. It is thus seen to extend well over the state.

Hosts. Funkhouser gives the following host list for this species: Wild grape, locust, elder, willow, oak, hickory, pignut, raspberry, sycamore, apple, and pear.

Ceresa brevicornis Fitch.

Ceresa brevicornis Fitch, Trans. N. Y. St. Agr. Soc., xvi, p. 451, 1856.

The following is the original description:

This is so similar to the common Buffalo tree hopper that it will scarcely be distinguished from it except by a practiced eye, although it is undoubtedly a distinct species. It differs from that in having the horns much more short, and the sides of the thorax when viewed in front are not gradually curved outwards, but are straight or rectilinear, with the horns abruptly projecting from the corner at the upper end of this line. The acute spine at the tip of the thorax is also more long and slender. The thorax between the horns is slightly convex. The dried specimen is of a pale dull yellow color freckled with faint pale green dots and with a paler straw-colored stripe, quite distinct, upon the angular sides of the thorax from each eye upward to the horn and from thence to the summit of the thorax.

Length of the female, 0.36.

It was met with upon hickory bushes in New Jersey.

Distribution. Van Duzee reports this species from Ontario, Connecticut, New York, New Jersey, Pennsylvania, Ohio, and Illinois. A single specimen taken at Kansas City, Mo., and determined by Dr. E. D. Ball, evidently puts this species within our range.

Hosts. Van Duzee gives basswood as a host.

Ceresa taurina Fitch.

(Pl. II, figs. 3, 4.)

Membracis taurina Harris, List Ins. Mass. in Hitchcock, Geol. Mass., p. 579, 1833 (MS name).

Enchenopa taurina Walker, List Homop., ii, p. 495, 1851 (MS name).

Ceresa taurina Fitch, Trans. N. Y. St. Agr. Soc., xvi, p. 335, 1856.

Funkhouser gives the following technical description:

Slightly smaller than *C. bubalus,* but resembling it in color; body slender and metopidium concave transversely; horns sharp, curving upward and backward.

Head roughly triangular, wider than long, roughly sculptured, not punctate nor pubescent, basal margin strongly curved; eyes prominent, brown and in some cases barred with darker, extending beyond the adjoining lateral margins of the pronotum; ocelli prominent, pearly, occasionally margined with reddish, nearer to each other than to the eyes; clypeus subrectangular, swollen and protruding, extending for half its length beyond lateral margin of face, faintly trilobed, apex bristled.

Pronotum deeply and coarsely punctured, bright green fading to yellow, sparingly pubescent; metopidium strongly concave, with curved, transverse margin, area above eyes smooth; suprahumeral horns slender and sharp, extending upward and backward, often much curved, tips generally darker than bases; dorsal crest high and strongly curved; semicircular lateral impression deep and brownish; posterior process slender, strongly decurved, extending beyond apex of abdomen and halfway to tips of tegmina.

Tegmina and wings entirely hyaline. Underparts of body and legs yellow-green.

Length, including tegmina, 9 mm.; width between tips of horns, 5.5 mm.

Internal male genitalia. Styles with anterior part weak, strongly narrowed near middle of connective, then much widened into the large posterior portion, which ends in an oblique and serrate tip, both margins of the caudal half of the posterior portion bearing long hairs; connective long and rather narrow, folding longitudinally, and with the usual basal incision; œdagus, viewed laterally, with basal process long and slender, with a distinct knob at point of attachment to the connective, the ventral process rather narrow, tapering gradually to subacute tip, functional orifice covering the middle third of the ventral side.

Distribution. Van Duzee reports this species from Ontario, Massachusetts, New York, New Jersey, Pennsylvania, Virginia, North

Carolina, Ohio, Michigan, Iowa, Kansas, Colorado, and Arizona. Specimens have been taken in Kansas in Sumner, Hodgeman, Douglas, Riley, Shawnee, Ottawa, Linn, Cherokee, Bourbon and Miami counties.

Hosts. Funkhouser reports this species from the following hosts: Raspberry, hickory, potato, blackberry, dahlia, hazelnut, locust, witch hazel, blue grass, oak, pear, apple, sweet clover, and bittersweet. Miss Branch adds horseradish and choke cherry. Matausch mentions *Solidago*.

Ceresa bubalus (Fabricius).

(Pl. II, figs. 1-2 and 5-8.)

Membracis bubalus Fabricius, Ent. Syst., iv, p. 14, 1794.
Centrotus bubalus Fabricius, Syst. Rhyng., p. 20, 1803.
Ceresa bubalus Fitch, Homop. N. Y. St. Cab., p. 50, 1851.

Funkhouser gives the following technical description.

Bright green fading to yellowish in cabinet specimens; horns heavy and stout, pointing directly outward; metopidium broadly convex; dorsal crest high and regularly arched; posterior process slender and recurved; tegmina and hind wings entirely hyaline; clypeus heavy, stout, and bristled.

Head one-third broader than long, longitudinal striate sculpturing; basal part broadly curved, front surface yellow, not punctate nor pubescent; eyes prominent, dark brown, extending beyond lateral margin of pronotum adjoining; ocelli prominent, protruding, with brilliant orange borders, nearer to each other than to the eyes; clypeus strong, heavy, continuing lateral outline of face, apex bristled.

Pronotum densely and coarsely punctate; metopidium strongly convex, smooth impunctate areas above the eyes, sparingly pubescent with short scattered hairs; suprahumeral horns stout, blunt, projecting almost directly outward, not at all upward, tips often brownish, whitish line extending backward from tip to lateral margin; lateral surface marked with light-colored semicircular impression; posterior process slender, depressed, extending half way to apices of tegmina and slightly beyond tip of abdomen, apex brownish.

Tegmina hyaline, bases lightly punctate. Undersurface of body yellowish. Legs greenish.

Length to apices of tegmina, 10 mm.; width between horns, 6 mm.

Internal male genitalia. Styles seemingly varying considerably in size, usually large, the anterior portion about as long as the posterior, which ends in a sharp point which is usually perfectly smooth, but sometimes bears a few indistinct teeth, the margins with two rows of hairs of which the outer one is longer and consists of longer hairs; connective about oval in outline, the base incised and with a distinct tendency to fold along a longitudinal keel; œdagus, viewed laterally, with the dorsal process varying from rather slender and straight to quite stout and hunch-backed, the

ventral process of medium thickness, the apex acute and with the usual membrane around the functional orifice near the middle third.

Distribution. This species occurs throughout the United States as shown by the following records of its distribution given by Van Duzee: Nova Scotia, Ontario, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Maryland, Delaware, North Carolina, Tennessee, Ohio, Indiana, Illinois, Iowa, Minnesota, Kansas, Missouri, Dakota, Montana, Wyoming, Colorado, Utah, New Mexico, Texas, and California.

As far as our collecting in this state shows, this species is by far the most widely distributed, specimens having been taken in the following counties: Douglas, Wilson, Riley, Comanche, Russell, Butler, Pawnee, Finney, Graham, Rawlins, Cherokee, Wallace, Harper, Shawnee, Wyandotte, Allen, Decatur, Harvey, Saline, Neosho, Sumner, Reno, Hodgeman, Osborne, Labette, Anderson, Pottawatomie, Wabaunsee and Ottawa.

Hosts. The list of plants on which this species feeds is very large, including many weeds and trees. Funkhouser records it from the following hosts: Sycamore, aster, poplar, potato, butternut, hazelnut, pear, sumac, oak, locust, elm, willow, elder, sweet clover, hickory, pignut, apple. Miss Branch reports it from osage orange, horseradish, gama grass, sunflower and alfalfa. Goding records it from apple, potato, tomato, pear, peach, plum, grape, apricot, almond, willow, locust and Japanese lily. Gillette and Baker report it from willow, apple, soft maple, *Solidago spectabilis, Aster canescens, Apocynum androsœmifolium, alfalfa, and Glycrrhiza lepidota.* The writer has taken it most frequently on apple, locust, hickory, sweet clover and alfalfa in Kansas.

GENUS STICTOCEPHALA Stal.

The members of this genus are greenish species, which differ from those of the preceding genus by lacking the suprahumeral horns.

The three species occuring in Kansas may be separated by the following key:

KEY TO SPECIES.

A. Carinate sides of the metopidium meeting before the middle of the body. *inermis.*

AA. Carinate sides of the metopidium meeting at or behind the middle of the body.

B. Carinate sides of the metopidium meeting at or near middle of dorsum. *lutea.*

BB. Carinate sides of metopidium meeting much behind middle of dorsum. *festina.*

Stictocephala inermis (Fabricius).

(Pl. IV, figs 1, 2, and 5-8.)

Membracis inermis Fabricius, Syst. Ent., p. 677, 1775.
Cicada inermis Gmelin *in* Linnaeus, Syst. Nat., edn. 13, i, pt. 4, p. 2093, 1788.
Centrotus inermis Fabricius, Syst. Rhyng., p. 21, 1803.
Membracis goniphora Say, Jl. Acad. Nat. Sci. Phila., vi, p. 243, 1830; Compl. Writ., ii, p. 377.
Smilia inermis Fitch, Homop. N. Y. St. Cab., p. 48, 1851.
Ceresa gonophora Walker, List Homop., iv, p. 1141, 1851.
Thelia inermis Walker, List Homop., iv, p. 1142, 1851 (under *lutea*).
Stictocephala inermis Stal, Of. Vet. Akad. Forh., xxvi, p. 246, 1869.
Stictocephala sanguino-apicalis Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 408, 1894.

Funkhouser gives the following technical description:

Fine large species, brilliant green, slowly fading to yellowish in dried material; metopidium perpendicular; dorsal crest high and arcuate; posterior process slender and curving downward; tegmina and wings entirely hyaline; upper parts of femora often marked with black.

Head broad, nearly smooth, very finely and faintly punctate, longitudinally striate; eyes prominent, subtriangular, very dark bordered with white, extending beyond adjoining lateral margins of pronotum; ocelli prominent, brownish, nearer to each other than to the eyes; inferior margins of vertex broadly sinuate; clypeus broad, sparingly pubescent, median lobe of apex extending below lateral lobes.

Pronotum densely and coarsely but not deeply punctured; metopidium convex, median carina distinct but irregular; sides of metopidium meeting before middle of body; lateral semicircular impression deep; posterior process long, slender, gradually acuminate, curving downward, extending beyond abdomen and reaching about halfway from internal angles to apices of tegmina.

Tegmina entirely hyaline, slightly wrinkled, bases greenish and lightly punctured. Undersurface of body yellowish; segments of abdomen in some cases bordered with black; notch of last ventral segment of female broadly angular. Femora often marked with black above; tarsi ferruginous.

Length to tips of tegmina, 9 mm.; width between humeral angles, 4 mm.

Internal male genitalia. Styles large and stout, the anterior portion long and wide; the posterior part curving to the truncate and serrate tips, which vary from nearly transversely truncate to quite obliquely truncate, the apex in the latter case being quite pronounced, the posterior fourth with two rows of very long hairs, the outer row being longer; connective short, widest just behind the middle, usually pentagonal in shape; œdagus, viewed laterally, much as in *Ceresa*, the dorsal process varying in width and with a small to a very pronounced hump, but with no projection to the connective, ventral process moderately stout, slightly concave on ventral side preapically, the functional orifice occupying nearly half its length medially.

Distribution. This species is found throughout the United States

as shown by the following distribution given by Van Duzee: Ontario, New York, New Jersey, Pennsylvania, North Carolina, Ohio, Illinois, Iowa, Dakota, Kansas, Missouri, Colorado, New Mexico, Arizona, California, and Montana.

In Kansas it has been taken in the following counties: Chautauqua, Douglas, Hodgeman, Cowley, Ottawa, Riley, Dickinson, Linn, Ellis, Bourbon, Montgomery, and Wabaunsee.

Hosts. Funkhouser records this species from sweet and red clover, timothy and apple. Miss Branch mentions gama grass. Goding reports it from plum, oats, oak and alfalfa. The writer has taken it very commonly on apple.

Stictocephala lutea (Walker).

Thelia lutea Walker, List Homop., ii, p. 559, 1851.
Thelia inermis Walker, List Homop., iv, p. 1142, 1851.
Gargara pectoralis Emmons, Nat. Hist. N. Y. Ins., p. 157, p. 1, 13, fig. 12, 1854.
Stictocephala lutea Stal, Of. Vet. Akad. Forh., xxvi, p. 247, 1869.

Funkhouser gives the following technical description:

Small species; grass-green above, usually marked with black below; metopidium sloping, dorsal crest not high, not regularly arcuate; tegmina smoky hyaline.

Head perpendicular, subtriangular, broader than long, finely punctate, sparingly pubescent, weakly sculptured; eyes prominent, brown usually banded with reddish, extending outward as far as lateral angles; ocelli distinct, yellowish margined with brown, much nearer to each other than to the eyes; inferior margins of vertex weakly sinuate, their ventral mesal angles ending in hooks; clypeus robust, extending only slightly beyond inferior margins of vertex.

Pronotum closely and deeply punctate; metopidium convex, median carina faint, smooth yellowish area on each side near base of head, sides of metopidium meeting at or a little before middle of body; dorsal crest not high, sloping gradually from junction of carinate edges of metopidium to posterior process; semicircular lateral impression weak; posterior process slender, gradually acute, extending as far as tip of abdomen and to a point on tegmina halfway between internal angles and apices.

Tegmina hyaline, smoky at apices. Under parts of thorax distinctly black. Legs generally marked with black. Notch of last ventral segment of female very small or obsolete.

Length, 6.5 mm.; width, 2 mm.

Internal male genitalia. Styles stout, especially posterior portion, bent in near middle of connective, then flaring widely till just before the incurved tips, which are transversely truncate with the inner angle prominent and distinctly serrate on both its margins, the apical fourth of the styles bearing on each margin a row of long hairs; connective large, elongate, widest just caudad of the middle; œdagus, viewed laterally, with medium-sized and humped dorsal

process, the ventral process with a distinct tubercle to connective and wide till the end of the functional orifice, then suddenly narrowed, after which it is nearly parallel-margined to the apex.

Distribution. Seemingly most abundant in the eastern United States as shown by the following records given by Van Duzee: Ontario, Connecticut, New York, New Jersey, Pennsylvania, District of Columbia, North Carolina, Georgia, Florida and Illinois. There are specimens of this species in the Snow collection from Beaver Creek, Montana, thus extending its range westward.

The following Kansas counties have yielded specimens: Linn, Montgomery, Neosho, Riley and Douglas.

Hosts. Matausch reports this species from *Solidago;* Funkhouser from oak and daisy; Goding from wheat.

Stictocephala festina (Say).

(Pl. III, figs. 5, 6.)

Membracis festina Say, Jl. Acad. Nat. Sci. Phila., vi, p. 243, 1830; Compl. Writ., ii, p. 377.

Stictocephala festiva Walker, List Homop., iv, p. 1141, 1852.

Stictocephala uniformis Stal, Hemip. Fabr., ii, p. 24, 1869.

Stictocephala festina Stal, Of. Vet. Akad. Forh., xxvi, p. 246, 1869.

The following is the original description:

Thorax with a subacute line each side before, meeting behind the middle. Inhabits Florida.

Body yellowish-green; thorax unarmed, carinate behind; at tip attenuated, subulate and complying with the general curvature; each side before a carinate line, meeting together at the carina behind the middle, with the carina tinged with rufous; front of the thorax not altogether flat, but a little convex; hemelytra, three terminal cellules unequal; the two costal ones equal, as broad as long; the inner one not obviously larger than the others together, somewhat longer than broad. Length to tip of hemelytra one-fifth of inch. The lateral prominent lines of the unarmed thorax, separate this species from all those I have described excepting goniphera, which meet before the middle of the length of the back.

Internal male genitalia. Styles quite small, anterior portion smaller than posterior, converging posteriorly to the wide posterior portions, which, opposite the connective, have a distinct lateral angle and then narrow but slightly to the obtuse apices, each bearing a long outer row and a short mesal row of stout hairs; connective quite small and triangular; œdagus, viewed laterally, quite characteristic, the dorsal process ending in a large rounded lobe which bears a small, fingerlike terminal process, the ventral process ending in a swollen and obliquely truncate apex which bears the functional orifice.

Both the styles, connective and œdagus of this species are so entirely different from the corresponding parts in the two preceding species that it does not seem possible that they could be members of the same genus.

Distribution. This species occurs abundantly in the Southern states and in more limited numbers as far north as Connecticut, and Canada in the East and Montana in the West. It has been reported from Florida, Virginia, Pennsylvania, Georgia, Missouri, Texas, Iowa, Montana, Colorado, New York, Connecticut, New Jersey, Ottawa, Can., Utah, Arizona, Mississippi, Tennessee, Alabama, North Carolina, Louisiana, Kansas, Iowa, Lower California, Mexico, and the West Indies.

Hosts. Wildermuth records this species from the following hosts: Alfalfa, cowpeas, tomato, almond, Bermuda grass, Johnson grass, wheat, barley, oats, bur clover, yellow sweet clover, soy beans, red clover, vetch, *Hordeum murinum*, beans, sunflower, cocklebur, *Erigeron canadensis*, mesquite, cottonwood, *Sporobolus airodes* and *Trichlaris mendocina*.

GENUS ACUTALIS Fairmaire.

In this genus are small species with the prothorax dark and with five apical cells in the tegmina, the veins of which are quite distinct. A single species is reported from Kansas.

Acutalis tartarea (Say)

(Pl. V, figs. 5, 6.)

Membracis tartarea Say, Jl. Acad. Nat. Sci. Phila., vi. p. 242, 1830; Compl. Writ., ii, p. 376.

Ceresa tartarea Walker, List. Homop., iv, p. 1141, 1852.

Acutalis tartarea Uhler, Bul. U. S. Geol. Geog. Surv., i, p. 345, 1876.

Ceresa semicrema Provancher, Pet. Faune Ent. Can., iii, p. 235, 1886.

Funkhouser gives the following technical description:

Small elongate species, very black, with eyes, undersurface of body and in some cases lateral margins of pronotum white, apices of tegmina abruptly hyaline.

Head twice as broad as long, densely black, smooth, not punctate nor pubescent; eyes prominent and white; ocelli small, white, about equidistant from each other and from the eyes; clypeus foreshortened, smooth, extending only slightly in a semicircular curve below inferior line of face.

Pronotum intensely black above, finely punctate, not pubescent, lateral margins and tip of posterior process in some cases marked with white; dorsal crest low, weakly convex; posterior process nearly straight, slightly decurved, more or less tectiform, extending beyond abdomen and almost to end of apical cells of tegmina, but not reaching apex of hyaline border.

Tegmina opaque black for basal two-thirds, apical third suddenly hyaline;

veins heavy and black; wide apical border; basal third punctate. Undersurface of body pale. Legs yellowish, tarsi fuscous.

Length to apices of tegmina, 4.5 mm.; width between humeral angles, 2 mm.

Internal male genitalia. Styles small, anterior portion slender, then wide opposite connective and narrowing again to the rather slender apical portions, which are strongly hooked, bear a few hairs, and end in an acute apex; connective comparatively large, semicircular; œdagus, viewed laterally, quite large, anterior process smaller and ending acutely, posterior process very large and ending obtusely.

Distribution. Van Duzee reports this species from Ontario, Massachusetts, New York, Pennsylvania, District of Columbia, North Carolina, Florida, Mississippi, Illinois, Iowa, Missouri, Colorado, and Utah. Miss Branch reports it from Douglas county, Kansas.

Hosts. Miss Branch gives *Ambrosia trifida* as a host.

GENUS MICRUTALIS Fowler.

The members of this genus are small and have but four apical cells in the tegmina, the veins of which are very obscure.

A single member of the genus occurs in Kansas.

Micrutalis calva (Say).

(Pl. V, figs. 3, 4.)

Membracis calva Say, Jl. Acad. Nat. Sci. Phila., vi. p. 242, 1830; Compl. Writ., ii, p. 376.
Membracis melanogramma Perty, Del. An. Art., pl. 35, fig. 10, 1834.
Smilia flavipennis Germar, Silb. Rev. Ent., iii, p. 240, 1835.
Acutalis flavipennis Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 497, 1846.
Ceresa calva Walker, List Homop., iv, p. 1141, 1852.
Acutalis melanogramma Walker, List Homop., ii, p. 591, 1851.
Acutalis calva Fitch, Trans. N. Y. St. Agr. Soc., xvi, p. 391, 1856.
Acutalis illinoiensis Goding, Can. Ent., xxv, p. 53, 1893.
Micrutalis illinoiensis Baker, Can. Ent., xxxix, p. 116, 1907.
Micrutalis calva Baker, Can. Ent., xxxix, p. 116, 1907.

Funkhouser gives the following technical description:

Very minute; one of the smallest species of Membracidæ in the United States; usually strongly marked with black, although color is variable; abdomen yellowish; tegmina hyaline, veins very indistinct.

Head broad, smooth, lightly punctate, not pubescent, upper third black, lower two-thirds yellowish; eyes prominent, white or gray; ocelli not prominent, pearly, about equidistant from each other and from the eyes and situated slightly above an imaginary line drawn through centers of eyes; clypeus rounded, continuing sinuate outline of inferior margin of face.

Pronotum low, nearly flat, finely punctate, not pubescent, anterior part usually black, tip of posterior process generally pale; posterior process stout, triangular, just reaching internal angles of tegmina and not extending as far as tip of abdomen.

Tegmina entirely hyaline, not punctate nor pubescent at base, veins indistinct, apical border broad. Entire abdomen pale; undersurface of thorax often marked with black. Femora black or ferruginous; tibiæ fuscous, tarsi ferruginous.

Length, 3-3.5 mm.; width, 1.5-1.7 mm.

Internal male genitalia. Styles with anterior and posterior parts of about equal length, anterior ends pointed, strongly swollen opposite connective, posterior part curving laterad, with a distinct hook before the acute apex, and with about a dozen hairs along the lateral margin; connective small, notched basally, widest at the truncate apex; œdagus, viewed laterally, U-shaped, the base nearly straight and with a large process to connective, functional orifice along the side of the posterior arm which bears numerous sawlike teeth on its cephalic aspect and a few scattered ones laterally.

Distribution. This is a very widely distributed species occurring throughout the Eastern and Southern states as shown by the following distribution given by Van Duzee: New Hampshire, Massachusetts, New York, Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, Georgia, Florida, Alabama, Mississippi, Ohio, Michigan, Illinois, Missouri, Kansas, Iowa, Arkansas, Texas, Colorado. It is also known to occur in the West Indies.

Specimens have been taken in the following Kansas counties: Reno, Douglas, Riley, Bourbon, Harper, Chautauqua, Cowley, Cherokee, Allen, Harvey, Montgomery, Butler, Kingman, Sumner, Miami and Ottawa.

Hosts. Funkhouser gives black locust as a host. It is commonly taken when sweeping weeds and grasses in Kansas.

GENUS CARYNOTA Fitch.

The members of this genus have the elytra partially covered by the pronotum, which lacks a horn or crest. The dorsum is low and rounded.

A single species occurs in Kansas.

Carynota mera (Say).

Membracis mera Say, Jl. Acad. Nat. Sci. Phila., vi, p. 301, 1831; Compl. Writ., ii, p. 379.
Carynota mera Fitch, Homop. N. Y. St. Cab., p. 48, 1851.
Gargara majus Emmons, Nat. Hist. N. Y. Ins., p. 156, pl. 13, fig. 6, 1854.
Ophiderma mera Fitch, Trans. N. Y. St. Agr. Soc., xvi, p. 465, 1856.
Craynota strombergi Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 443, 1894.

Funkhouser gives the following technical description:

Fine large species; gray marked with dark brown and chestnut; pronotum convex and elevated; tegmina fuscous-hyaline tipped with dark brown.

Head nearly twice as broad as long, uniform light gray, very distinctly punctate, sparingly pubescent with short, white hairs; eyes very prominent

and brown; ocelli prominent, pearly, margined with orange, somewhat protruding, nearer to each other than to the eyes; clypeus subtriangular, continuing inferior outline of face, tip produced in small tooth, hirsute.

Pronotum gray, finely punctate, pubescent, median carina percurrent; metopidium convex, irregular brown mark above internal angle of each eye; dorsal line arcuate, suddenly depressed before posterior process in female, depression not so evident in male; wide, dark brown, transverse band crossing middle of pronotum on each side; posterior process heavy, pointed, tip chestnut.

Tegmina smoky hyaline, veins prominent, bases punctate, especially along veins and at costal margins, tips dark brown or black. Legs and undersurface of body ferruginous.

Length: female, 10 mm.; male, 8.5 mm. Width: female, 5 mm.; male 4 mm.

Distribution. Van Duzee reports this species from Ontario, New York, New Jersey, Pennsylvania, North Carolina, Ohio, Illinois, Iowa, Missouri and Texas. The writer took a single specimen in Ottawa county, Kansas.

Hosts. Funkhouser mentions hickory, butternut, pecan and oak as hosts of this species.

GENUS THELIA Amyot & Serville.

The members of this genus are at once recognized by the possession of a long horn on the anterior part of the prothorax, which points upwards and forwards.

Both members of the genus known to occur in the United States are found in Kansas. They may be separated by the following key:

KEY TO SPECIES.

A. Prothorax of male without lateral yellow stripe. *uhleri.*
AA. Prothorax of male with lateral yellow stripe. *bimaculata.*

Thelia uhleri Stal.

Thelia uhleri Stal, Of. Vet. Akad. Forh., xxvi, p. 248, 1869.

The original description follows:

Griseo-ferruginea, pilosa, thorace remote pallido-consperso; tegminibus sordide hyalinis, apice fusco-nebulosis, basin versus punctatis. Female: Long. 9; cum cornu, 13. Lat. 4½ mill. Wisconsin. (Mus. Holm.)

T. bimaculatæ maxime affinis, pictura thoracis, ejusdem cornu antico paullo longiore processuque postico rugis longitudinalibus destituto divergit. Caput remote punctulatum. Thorax dense distinctque punctatus, angulis lateralibus nonnihil prominulis, rectis, cornu antico antrorsum valde nutante, processu postico apicem tegminum subattingente.

Ad hanc speciem verisimiliter spectat Fitch, quum dicit *Membracem belligeram* Say ad *Theliam* referendam esse; hæc species autem ad *Platycotem* pertinet et eadem est ac *P. sagittata* Germ., quæ Americam borealem (nec Brasiliam) inhabitat.

Distribution. Van Duzee reports this species from Ontario, New York, Pennsylvania, Michigan, Illinois, Wisconsin, and Kansas.

Hosts. Seemingly unknown.

The writer has not seen specimens of this species, but it is included in this paper because of Van Duzee's records.

Thelia bimaculata (Fabricius).

(Pl. V, figs. 1, 2.)

Membracis bimaculata Fabricius, Ent. Syst., iv, p. 10, 1794.
Hemiptycha binotata Harris, Rept. Ins. Mass., p. 179, 1841.
Hemiptycha acuminata Harris, Rept. Ins. Mass., p. 179, 1841.
Thelia bimaculata Amyot & Serville, Hemip., p. 541, 1843.
Thelia unanimis Walker, List Homop., ii, p. 566, 1851.

Funkhouser gives the following technical description:

Female. Gray with indistinct darker irregular markings; porrect cylindrical horn slightly flattened and somewhat darker in color at tip; tegmina hyaline, apices fuscous, almost reaching extremity of dorsal process.

Head, including eyes, twice as broad as long, grayish-yellow mottled with ferruginous and brown; margins of loræ strongly sinuate; eyes dark brown; ocelli white, nearer to each other than to the eyes and situated on a line drawn through centers of eyes; clypeus pilose; beak extending to posterior coxæ; head very sparingly punctate and sparsely pilose.

Thorax gray, deeply and densely punctate; median percurrent brown line sharpened into a ridge on extremity of horn and at apex of posterior process; sides of prothorax roughly and irregularly carinate; horn porrect and greatly variable in length; cylindrical except at extreme tip, where it is flattened laterally; posterior process heavy, tectiform, gradually acute, almost straight, very slightly decurved and extending beyond apices of tegmina.

Tegmina hyaline, apices fuscous, bases and costal regions lightly punctate; underwings hyaline, two-thirds as long as tegmina. Undersurface of body gray-brown, pubescent. Legs uniform yellow-brown; femora thick and smooth; tibiæ and tarsi densely pilose.

Length, 11 mm., including horn, 14 mm.; width between humeral angles, 5.5 mm.

Male: Differs from female in size and markings. Smaller, body somewhat less robust; porrect horn usually shorter and tending to curve; tegmina equalling apex of posterior process. Color deep chocolate brown; porrect horn almost black; apex of posterior process becoming cinnamon brown; a wide, brilliant, lemon-yellow longitudinal stripe on each side of prothorax, extending from margin halfway to median dorsal line, also small patches of yellow on metopidium; head yellow with brown patches. Undersurface of abdomen darker than in female.

Internal male genitalia. Styles with anterior portion short, posterior part longer, wide, and parallel-margined till near apices, which are curved strongly laterad and end truncately but with a distinct recurved hook, the curved apices bearing scattered short hairs; connective large, rather distinctly seven-sided; œdagus, viewed laterally, with a slender process to anal tube, the apical portion

very large, club-shaped, the functional orifice just before the extreme apex, the anterior aspect of the apex with many filelike teeth.

Distribution. Van Duzee reports this species from Ontario, Massachusetts, New York, New Jersey, Pennsylvania, North Carolina, Ohio and Illinois. The writer has taken it in Douglas county, Kansas.

Hosts. Black locust seems to be the only host.

GENUS GLOSSONOTUS Butler.

The members of this genus possess a tongue-shaped crest, which arises from between the humeral angles.

A single species of the genus is recorded from Kansas.

Glossonotus acuminatus (Fabricius).

Membracis acuminata Fabricius, Syst. Ent., P. 675, 1775.
Cicada acuminata Gmelin in Linnæus, Syst. Nat., edn. 13, i, pt. 4, 2094, 1778.
Centrotus acuminata Fabricius, Syst. Rhyng., p. 18, 1803.
Thelia acuminata Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 310, pl. 5, fig. 15, 1846.
Hemiptycha acuminata Harris, Treat. Ins. Inj. Veg., edn. 3, p. 223, 1862.
Telamona acuminatus Stal, Hemip. Fabr., ii, p. 115, 1869.
Glossonotus acuminata Butler, Cist. Ent., ii, p. 222, 1877.
Thelia crataegi Smith, Ins. N. J., p. 441, 1890.

Funkhouser gives the following technical description:

Dark gray mottled with brown; dorsal crest high, flattened and swollen at tip; humeral angles prominent and triangular; tegmina hyaline tipped with brown, veins punctured.

Head almost as long as wide, gray with distinct scattered black punctures and fine whitish pubescence; base sinuate; eyes large, prominent, brown, extending as far as bases of humeral angles; ocelli large, prominent, pearly with white margins, nearer to each other than to the eyes; clypeus continuing inferior line of face, punctate with black, pubescent with white, tip prolonged into a point; antennæ long and well developed.

Pronotum dark gray with irregular markings of brown, coarsely and regularly punctate with black, very sparingly pubescent; metopidium convex, median carina prominent and decorated with alternate lines of brown and yellowish, irregular black markings above internal angles of eyes, humeral angles prominent, triangular, flattened, acute; pronotal crest almost as high as length of pronotum, widened and flattened at tip, margin decorated with pale areas, projecting usually forward as well as upward; posterior process gradually acuminate, reaching apices of tegmina.

Tegmina hyaline, tips clouded with smoky brown, bases and margins of veins punctate, veins prominent. Undersurface of thorax fuscous; abdomen ferruginous. Legs fuscous marked with brown.

Length, 10 mm.; width between tips of humeral angles, 6 mm.

Distribution. Van Duzee reports this species from Ontario, Massachusetts, New York, New Jersey, Pennsylvania, Michigan, Iowa, Kansas and Arkansas.

Hosts. Funkhouser gives young white oak as the host.

GENUS HELIRIA Stal.

The members of this genus are characterized by having a distinctly step-shaped dorsal crest.

Two members of the genus are known to occur in Kansas. These Van Duzee separates by the following key:

KEY TO SPECIES.

A. Larger, 12-13 mm.; grey or brownish grey; posterior foliole of the crest little elevated above the dorsal line anteriorly, its hind angle subacute; humeral angles greatly produced. *cristata.*

AA. Smaller, 8 mm., darker brown; posterior foliole of the crest, when well differentiated, elevated at least its own width above the dorsal line. *scalaris.*

Heliria cristata (Fairmaire).

Thelia cristata Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 311, pl. 5, fig. 14, 1846.
Telamona fagi Fitch, Homop. N. Y. St. Cab., p. 51, 1851.
Telamona acclivata Emmons, Nat. Hist. N. Y. Ins., p. 155, pl. 3, fig. 5, 1854.
Heliria cristata Stal, Of. Vet. Akad. Forh., xxiv, p. 556, 1867; xxvi, p. 249, 1869.
Telamona cristata Fowler, Biol. Centr. Am., Homop., ii, p. 144, pl. 9, fig. 6, 1896.

The following is the original description:

T. cristata. Mexique. Long. 0.012.

Praecedente differt testaceo-obscuro et tuberculorem dispositione; primo antice inclinato, secundo sat fortiter acuto.

Ne differe de l'espece precedente que par se couleur d'un testace obscue, et la disposition des lobes dorsaux dont l'anterieur est incline en avant, et le second plus aigu. Coll. Signoret.

The preceding species referred to above is *H. scalaris.*

Distribution. Van Duzee reports this species from New York, New Jersey, North Carolina, and Illinois. Popenoe reports it from Kansas.

Hosts. Unknown.

Heliria scalaris (Fairmaire).

Thelia scalaris Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 311, 1846.
Telamona fagi Fitch, Homop. N. Y. St. Cab., p. 51, 1851.
Thelia scalaris Walker, List Homop., ii, p. 565, 1851.
Heliria scalaris Stal, Of. Vet. Akad. Forh., xxiv, p. 556, 1867; xxvi, p. 249, 1869.
Telamona scalaris Butler, Cist. Ent., ii, p. 222, 1877.

Funkhouser gives the following technical description:

A small species, uniform brown in color; crest as high as its length at base; posterior process not reaching apices of tegmina; tegmina smoky hyaline, tips brown.

Head as wide as long, sculptured, yellowish, irregularly punctuate with brown, sparingly pubescent; base strongly sinuate; eyes prominent, brown, reaching base of humeral angles; ocelli prominent, translucent, nearer to each other than to the eyes; clypeus extending below inferior margin of face, yellowish, punctured with brown, pubescent.

Pronotum uniform brown, coarsely punctured; dorsal crest swollen at base, flattened at apex, as high as its length at base, distinctly step-shaped, anterior

lobe rounded and projecting forward, posterior lobe sharply angular, two-thirds as high as anterior, both lobes in some cases margined with patches of darker brown; posterior process short, heavy, acute, not reaching apices of tegmina; humeral angles triangular, flattened, blunt.

Tegmina smoky hyaline, bases dark brown and punctate, tips brown, veins heavy and often punctured along margins. Undersurface of thorax ferruginous, segments margined with paler; abdomen brown. Legs ferruginous; tibiæ and tarsi hairy.

Length, 8 mm.; width, 4.8 mm.

Distribution. Van Duzee reports this species from Ontario, New York, New Jersey, Pennsylvania, Illinois and Colorado. There is a specimen in the Snow collection from Kansas City, Mo., so it undoubtedly occurs in eastern Kansas.

Hosts. Unknown.

GENUS TELAMONA Fitch.

The following is the original description of the genus:

Humeral angles projecting, pointed and earlike: dorsum compressed-foliaceous, the keel abruptly elevated at one or both its ends, forming a somewhat square crest or foliole; thorax nearly or quite reaching the tips of the elytra, with elevated longitudinal lines on each side; apical cellule triangular, its end rounded. The squarish dorsal crest forms a marked distinction between the genus here proposed, and that of *Thelia,* to which it is most nearly related.

Eleven members of this genus are known to occur in Kansas. These may be separated by the following key:

KEY TO SPECIES.

A. Anterior margin of crest sloping to front of metopidium, without obvious sinus at its anterior base.
  B. Crest, if elevated, more or less rounded or pointed at apex.
    C. Crest distinctly elevated.
      D. Brownish species; crest higher and triangular. *pyramidata.*
      DD. Greenish species; crest an obtusely conical hump. *viridia.*
    CC. Crest scarcely elevated, broadly rounded above. *obsoleta.*
  BB. Crest elevated, square or nearly so at apex.
    C. Crest not as high as broad.
      D. Greenish-brown species. *lugubris.*
      DD. Gray, with oblique brown fascia. *decorata.*
    CC. Crest as high or higher than broad. *querci.*
AA. Crest nearly vertical before or sometimes overhanging.
  B. Color greenish or yellowish.
    C. Females bright green; males yellow, banded with brown. *unicolor.*
    CC. Both sexes of about the same color.
      D. Pronotal hump very high. *extrema.*
      DD. Pronotal hump moderate. *collina.*

BB. Color not green.
C. Yellow, mottled with brown. *tristis.*
CC. Gray, with transverse brown band. *ampelopsidis.*

Telamona pyramidata Uhler.

(Pl. v, figs. 7, 8.)

Telamona pyramidata Uhler, Wheeler's Rept. Chief Eng. for 1877, p. 1333.
Telonaca pyramidata Ball, Proc. Biol. Soc. Wash, xxxi, p. 28, 1918.

Funkhouser gives the following technical description:

Long, narrow body; crest triangular and pyramidal, as the name would suggest; mottled brown with a dark transverse fascia extending from tip of crest to lateral margin of pronotum, and a second shorter fascia behind it; posterior process extending to tips of tegmina; tegmina hyaline, punctate at bases, brown at apices. Differs from *T. declivata* chiefly in shape of dorsal crest.

Head wider than long, yellowish with large irregular punctures of brown, sparingly pubescent; base regularly sinuate; eyes large, prominent, gray; ocelli large, prominent, somewhat protruding, translucent; clypeus subtriangular, sutures distinct, apex slightly produced, hairy.

Pronotum deeply punctate, not pubescent; metopidium convex, decorated with patches of yellowish and dark brown, median carina prominent, heavy, black, broken by circular areas of yellowish; humeral angles prominent, tectiform, blunt, brownish; dorsal crest triangular, rounded at tip, margin flattened and brown, posterior margin pale; posterior process long, slender, slightly curving downward, extending beyond tips of tegmina; median carina percurrent.

Tegmina hyaline, bases and costal margins coarsely punctate but not pubescent, tips brown. Undersurface of thorax flavous; abdomen dark brown. Legs yellowish; tibiæ mottled with brown, hairy; tarsi flavous; claws ferruginous.

Length, 9-11 mm.; width, 5-6 mm.

Internal male genitalia. Styles with anterior portion broad and flat, posteriorly curved outward and with a large, blunt apical hook, the apical fourth with a few short hairs; connective large and heart-shaped, bearing three longitudinal ridges; œdagus, viewed laterally, U-shaped, anterior process rather slender and with a distinct tooth on its cephalic aspect, posterior process large and club-shaped, the apex with sawlike teeth on its anterior surface, and the functional orifice on the posterior.

Distribution. Gillette and Baker report this species from Colorado and Funkhouser from New York. The writer has taken it at Ames, Iowa. Specimens have been taken in Kansas from Johnson, Pawnee, Cherokee, Riley and Pottawatomie counties. It seemingly occurs throughout the Eastern states and west to the Rocky Mountains.

Hosts. Funkhouser reports it on chestnut oak. Gillett and Baker

give cottonwood and Virginia creeper. The writer has taken it abundantly on willow.

The writer has been unable to find any characters that would seem to separate this species from the members of the genus *Telamona*. The genitalia are precisely as in other members of the genus. Hence it is our belief that the genus *Telonaca* should be sunk as a synonym of *Telamona*.

Telamona viridia Ball.

(Pl. VII, figs. 7, 8.)

Telamona viridia Ball, Proc. Biol. Soc. Wash., xvi, p. 178, pl. 1, fig. 3, 1903.

The original description follows:

Resembling *pyramidata* in size and form, but with less of a hump. Grass-green, the male with some fuscous on posterior half of hump and again at apex of pronotum.

Length: female, 11 mm.; male, 9 mm. Width, female, 5.3 mm.

Pronotal hump in the shape of an obtuse pyramid one-third the distance back from eye to apex of pronotum, a slight angle on posterior margin just below apex especially marked in the male. Height of hump slightly less than one-third the pronotal length. Humeral angles broad, slightly rounded, a trifle longer than eye.

Color. Female, grass-green slightly mottled with yellow; carina light except at apex of hump and at tip, where it is tawny. Male, grass-green; carina light interrupted with tawny; a fuscous band runs obliquely backward from apex of hump and fades out before reaching the pronotum proper, or sometimes connects with a tawny spot on lower margin, whole apex of pronotum tawny.

Internal male genitalia. Styles large, anterior end flattened, posterior part stout, curved strongly laterad apically, bluntly hooked, and bearing a few scattered hairs; connective large, heart-shaped, with three longitudinal ridges; œdagus, viewed laterally, U-shaped, anterior arm more lightly chitinized and with short blunt anterior tooth, posterior arm club-shaped, the apex anteriorly with many small filelike teeth, posteriorly with the functional orifice.

Distribution. Ball reports the type specimens from Colorado, Iowa and Illinois. There is a specimen in the Snow collection, taken by F. X. Williams, from Gove county, and a single specimen has been taken in Riley county, Kansas.

Hosts. Ball gives cottonwood (*Populus monilifera*) as the host.

Telamona obsoleta Ball.

Telamona obsoleta Ball, Proc. Biol. Soc. Wash., xvi, p. 178, pl. 1, fig. 2, 1903.

The following is the original description:

Resembling *irrorata*, but smaller and with a smaller and more rounding hump. Length: female, 10 mm.; male, 9 mm. Width, 5 mm.

Dorsal hump low and much inflated; it scarcely narrows from the base to just before the apex where it rounds in to form a carina. Anterior margin rising just back of the humeral angles and extending from there half way to the apex of the pronotum. The height is about equal to the whole length and it rounds down to the pronotum proper at both extremities. Front much elevated above the level of the eyes so that the ocelli are farther from the base of front than from each other.

Color. Yellow with the punctures fuscous, sometimes coalescing into brownish fuscous spots, giving the whole insect an irrorate and mottled appearance, with little regularity of pattern. Usually there is a semicircle of lighter shade back of the humeral angles and a light spot on middle of hump. There is a pair of large, straggling black marks above and within the eyes, some brown on the inner nervures of corium, and a smoky brown cloud at apex.

Distribution. Ball reports this species from Iowa and from Kansas. Van Duzee records it from Illinois and Funkhouser from New York. In Kansas it has been taken in Pottawatomie and Montgomery counties.

Hosts. Ball gives elm as a host; Funkhouser reports it from oak.

Telamona lugubris Ball.

Telamona lugubris Ball, Proc. Biol. Soc. Wash., xvi, p. 179, 1903.

The original description follows:

Form of *reclivata* nearly, slightly shorter and stouter built and with a lower and longer hump and lacking the markings of that species. Obscurely greenish brown. Length: female, 11 mm.; male, 9.5 mm. Width, 5.5 mm.

Dorsal hump of moderate size, arising just back of lateral angles; anterior margin sloping back, forming a right angle with the inclined crest, posterior margin perpendicular or slightly overhanging. Base of hump occupying a little over two-fifths of distance from humeral angles to apex of pronotum. Humeral angles blunt and obtuse, about two-thirds as long as the eye.

Color. Pale yellow, the more or less darkened punctures giving the insect a general grayish cast with still darker shadings on the lateral faces of the hump and sometimes on the apex of pronotum.

Distribution. Ball reports this species from Iowa and also from Pottawatomie county, Kansas. Doctor Funkhouser has specimens from New Mexico.

Hosts. Ball gives scrub oak as the host.

Telamona decorata Ball.

Telamona decorata Ball, Proc. Biol. Soc. Wash., xvi, p. 179, 1903.

The original description follows:

Smaller than *lugubris,* with a shorter and more rounding hump. Yellowish fuscous with the hump deep testaceous brown. Length, 9 mm.; width, 4.5 mm.

Dorsal hump sloping up from both front and rear, crest rounding, highest just in front of the middle, hump occupying scarcely two-fifths of the pronotum from the humeral angles back. Humeral angles short and blunt, about two-thirds the length of the eye.

Color. Face and pronotum pale yellow, very slightly washed with brown in the female, and with a definite brown shade in the male; median carina alternately light and dark before the hump. Hump rich testaceous with a few light spots on the sides, a definite light mark at the base in front, which may extend up on to the carina, and the whole posterior margin light. This latter light spot extends down on to the pronotum and connects with an irregular transverse light band about halfway to apex. Each side of this band is an irregular testaceous band, the anterior one connected with the testaceous hump. A pair of spots above the eyes and the apex of elytra brownish fuscous.

Distribution. Ball described this species from specimens taken in Iowa, Arkansas, and Pottawatomie county, Kansas. Funkhouser reports it from New York.

Hosts. Ball mentions red oak as a host.

Telamona querci Fitch.

Telamona querci Fitch, Homop. N. Y. St. Cab., p. 51, 1851.
Telamona quercus Walker, List Homop., iv, p. 1145, 1852.
Thelia quercus Smith, Cat. Ins. N. J., edn. 1, p. 441, 1891.
Telamona brunneipennis Buckton, Monog. Membr., p. 197, pl. 43, fig. 1, 1903.

Funkhouser gives the following technical description:

Very close to *T. monticola;* pronotum shorter, darker; dorsal crest with prominent pale fascia on posterior margin; tegmina nearly hyaline, tips faintly clouded.

Head roughly sculptured, flavous mottled with brown, faintly longitudinally striate, very faintly punctate, pubescent, base weakly sinuate; eyes prominent, dark brown; ocelli very prominent, protruding, brownish, margins pale, much nearer to each other than to the eyes; clypeus nearly flat, punctate, pubescent, base marked with brown, tip extended below inferior margin of face.

Pronotum densely but finely punctate, sparingly pubescent, dark brown mottled with green; metopidium convex, median carina prominent, black interrupted with pale green; humeral angles short and blunt; dorsal crest sloping backward, longer than high, higher before than behind, posterior margin distinctly pale; posterior process short, acute, marked with greenish before apex, not reaching tips of tegmina.

Tegmina hyaline, bases punctured but not pubescent, tips clouded with brown, veins brown. Undersurface of body brown. Legs flavous; tibiæ hairy.

Length of pronotum, 9 mm.; to tips of tegmina, 11 mm.; width, 5.5 mm.

Distribution. Van Duzee reports this species from Ontario, New York, District of Columbia, Ohio, Colorado, New Mexico, and Nevada. Popenoe reports this species from Kansas, and there is a specimen in the Snow collection from Kansas City, Mo., so that it doubtless occurs in the state. The writer took a single specimen of the species at St. Paul, Minn.

Hosts. Funkhouser gives white and chestnut oak as hosts.

Telamona unicolor Fitch.

Telamona unicolor Fitch, Homop. N. Y. St. Cab., p. 50, 1851.
Telamona fasciata Fitch, Homop. N. Y. St. Cab., p. 50, 1851.
Hemiptycha diffusa Walker, List Homop., Suppl., p. 143, 1858.

Funkhouser gives the following technical description:

Females large, brilliant uniform grass-green; males smaller, bright yellow with deep brown fascia. Very striking in color; large size; crest high and square; tegmina tipped with brown.

Female. Head nearly twice as wide as long, green punctate with brown, finely pubescent; eyes large, brown; ocelli large, orange, nearer to each other than to the eyes; clypeus deeply punctate, pubescent, tip in a pointed extension.

Pronotum concolorous green, fading to mottled yellow in cabinet specimens; very finely punctate and pubescent; metopidium more or less angular, median carina distinct, three small brown spots mesad of humeral angles; humeral angles produced, triangular, blunt; crest large, high, much higher before than behind, anterior margin less sloping than posterior, dorsal margin brownish; posterior process long, gradually acute, apex brownish and not reaching tips of tegmina.

Tegmina brownish hyaline, bases and costal regions punctate with black, tips clouded with dark brown, veins prominent. Undersurface of thorax flavous, abdomen yellowish, pubescent, ovipositor brown. Legs flavous; tibiæ mottled with brown; tarsi ferruginous.

Length, 11 mm.; width, 6 mm.

Male. Differs from female in size and color. Head mottled brown and yellow, much darker than that of female, much sculptured, inferior line of face strongly sinuate.

Pronotum bright yellow, metopidium strongly shaded with brown; dark brown fascia on front of dorsal crest; dark brown fascia on posterior third of crest extending gradually narrowed to lateral margin of pronotum; posterior median line of crest yellow, transverse band of yellow behind crest; apex of posterior process brown.

Undersurface of body deep brown. Legs strongly flavous marked with brown.

Length, 10 mm.; width, 5 mm.

Distribution. Van Duzee reports this species from Ontario, New York, New Jersey, Pennsylvania, North Carolina, Michigan, Illinois, Iowa, Kansas, Missouri and Texas. In Kansas it has been taken in Pottawatomie county.

Hosts. Funkhouser gives hickory, butternut, walnut and basswood as hosts.

Telamona extrema Ball.

Telamona extrema Ball, Proc. Biol. Soc. Wash., xvi, p. 179 pl. 1, fig. 1, 1903.

The original description follows:

Form of *unicolor* nearly, smaller, and with a still longer hump. Greenish testaceous. Length: female, 10 mm.; male, 9 mm. Width, 5 mm.

Pronotal hump very high, almost quadrate, occupying the anterior three-fifths of pronotum, anterior margin rising perpendicularly from face, crest highest just back of the well rounded anterior angle from which it slopes slightly to the almost perpendicular posterior face. Humeral angles moderate, as long as the eyes.

Color: Greenish testaceous; a spot above each eye and the median carina back to the posterior angle of hump fuscous; posterior face of hump broadly marked with creamy white, which narrows to a line on the carina posteriorly in the female, and disappears entirely in the male. The lower margin of the humeral angles is sometimes marked with fuscous.

Distribution. This species was described from specimens taken in Iowa, and Marion county, Kansas. Van Duzee reports it also from Massachusetts, Rhode Island and New Jersey.

Hosts. Ball gives oak as a host.

Telamona collina (Walker).

Thelia collina Walker, List Homop., ii, p. 565, 1851.
Telamona collina Butler, Cist. Ent., ii, p. 220, 1877.
Telamona turritella Buckton, Monog. Membr., p. 198, pl. 44, fig. 6, 1903.

The following is the original description:

Testacea vel viridi-flava; prothorax apice niger; carina ferruginea vel fulva; alæ limpidæ; alæ anticæ basi fulvæ.

Testaceous, shining: head finely punctured, short, almost transversely spindle-shaped, much narrower than the fore-chest, impressed on each side of the disk, with five slight undulations along the hind border, and seven on the fore border; a slight furrow extends from the hind border to the face, whose hind side is slightly obconical and occupies less than half the length of the face: fore-chest roughly punctured, convex and with a slight middle ridge in front, forming on each shoulder a conical, flat, very prominent horn; keel very deep behind the shoulders, conical and slightly inclined forward, veined along the lower side, slightly undulating and declining abruptly along half its length, straight and slightly attenuated from thence to the tip, which is black and extends far beyond the tip of the abdomen; ridge mostly ferruginous; sides slightly tumid; wings colorless; veins tawny; fore-wings partly brown along the hind borders and at the tips, tawny and punctured towards the base. Length of the body, 4 lines; of the wings, 10 lines.

New York.

Var. β. Head and fore part of the fore-chest pale yellow tinged with green; keel tawny, partly green; legs tinged with green; oviduct pitchy, curved.

St. John's Bluff, E. Florida.

Distribution. Van Duzee reports this species from New York, Pennsylvania and Florida. It has also been taken in Johnson county, Kansas.

Hosts. Mrs. Slosson and Van Duzee report it from sycamore.

Telamona tristis Fitch.

Telamona tristis Fitch, Homop. N. Y. St. Cab., p. 51, 1851.
Telamona coryli Fitch, Homop. N. Y. St. Cab., p. 51, 1851.
Telamona spreta Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 417, 1894.

Funkhouser gives the following technical description:

Near *T. ampelopsidis* in appearance, but smaller and lighter and differing in coloration; crest high and square, higher before than behind; tegmina hyaline tipped with brown; pronotum yellow mottled with red-brown.

Head subquadrate, yellowish, faintly longitudinally striate, finely punctate, closely pubescent, faintly mottled with brown; eyes prominent, brown; ocelli pearly, nearer to each other than to the eyes; clypeus pubescent, tip slightly extending below inferior margin of face.

Pronotum densely punctate, not pubescent, ground color light yellow, a broad transverse reddish-brown fascia nearly covering metopidium, a second on front of crest, and a third extending down posterior third of crest and reaching lateral margin of pronotum; humeral angles produced, triangular, flattened, blunt, tips dark; dorsal crest nearly square, truncate at tip, posterior margin pale; posterior process long, sharp, not quite reaching tips of tegmina.

Tegmina smoky hyaline, bases opaque and punctate, tips brown. Undersurface of thorax flavous; abdomen brown. Legs ferruginous.

Length, 8.5 mm.; width, 5 mm.

Distribution. Reported from Ontario, New York, New Jersey, Pennsylvania and Illinois. There are specimens in the Snow collection from Kansas City, Mo., so it doubtless occurs in Kansas.

Hosts. Funkhouser reports this species from hazelnut and oak.

Telamona ampelopsidis (Harris).

Membracis cissi (Harris MS), List Ins. Mass., *in* Hitchcock, Geol. Mass., p. 584, 1833.
Membracis ampelopsidis Harris, Rept. Ins. Mass., p. 181, 1841.
Thelia cyrtops Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 310, 1846.
Telamona ampelopsidis Fitch, Homop. N. Y. St. Cab., p. 51, 1851.
Telamona monticola Uhler, Stand. Nat. Hist., ii, p. 225, fig. 302, 1884.

Funkhouser gives the following technical description:

Fine, large, well-marked species; crest high, erect, front margin nearly perpendicular, hind margin sloping; ground color grayish with brown transverse fascia across metopidium, deep brown area at frontal base, brown fascia extending from posterior tip of crest to lateral margin of pronotum; tegmina hyaline, with brown tips.

Head yellowish, faintly marked with brown below, sculptured, finely punctate, sparingly pubescent; eyes prominent, grayish brown; ocelli large, yellowish, nearer to each other than to the eyes; clypeus smooth, pubescent, tip triangular.

Pronotum finely punctate, very sparingly pubescent; metopidium yellow at frontal margin, black spot above each eye, median carina prominent, black; humeral angles prominent, blunt, extending beyond the eyes as far as the length of the eyes; dorsal crest higher before than behind, margin somewhat flattened; posterior process long, strong, heavy, extending almost to tips of tegmina.

Tegmina hyaline, lightly punctate at base and along costal margins, tips brown. Undersurface of body generally uniform gray-brown.

Male smaller and darker than female, often without characteristic markings.

Length: female, 10 mm.; male, 8-9 mm. Width: female, 6 mm.; male, 5 mm.

Distribution. This species has been reported from Massachusetts, New York, New Jersey, Maryland, North Carolina, Illinois, Kansas and Colorado. It has been taken in Kansas in Riley, Leavenworth and Douglas counties.

Hosts. Occurs only on *Psedera quinquefolia,* our common Virigina creeper.

GENUS TELAMONANTHE Baker.

The members of this genus greatly resemble those of the preceding genus in general appearance, but they are smaller insects as a rule and are all characterized by having the basal costal cell of the tegmina completely punctate.

One species of the genus has been taken in Kansas and another at Kansas City, Mo., so that both doubtless occur in the state.

These species may be separated by the following key:

KEY TO SPECIES.

A. Crest nearly quadrate, humeral angles very long. *rileyi.*
AA. Crest rounded, humeral angles short. *modesta.*

Telamonanthe rileyi (Goding).

Telamona rileyi Goding, Ent. News, iii, p. 108, 1892.
Telamona coquilletti Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 420, 1894.
Telamonanthe rileyi Baker, Can. Ent., xxxix, p. 115, 1907.

The original description follows:

Similar in size and form to *coquilletti* Goding; the markings are less prominent, lateral horns much less produced.

Male. Greenish yellow, marked with ferruginous lines, punctured. Head greenish yellow, lightly punctured. Prothorax yellowish green, mottled with ferruginous, longitudinal, elevated lines; dorsal carina percurrent, a deeply impressed dot on each side of its base; dorsal crest somewhat elevated, much compressed, strongly compressed anteriorly at base and posteriorly behind middle, the highest point of crest at beginning of postesior third, from which point it gradually slopes anteriorly in a gentle curve continuous with anterior third of prothorax, posteriorly sloping for a short distance, then forming an obtuse angle; at the base another obtuse angle is formed, from which the median carina curves gently to the apex; lateral angles a little prominent; tegmina with basal half coriaceous, apical half subcoriaceous, a brown spot at apex. Chest below is dark yellow, coxæ piceous. Legs yellow and hairy; abdomen yellow. Length, 6 mm.

Habitat: Marlo county, Cal.

Distribution. The type specimen came from California. There are specimens in the Snow collection from Arizona and from Lincoln county, Kansas.

Hosts. Unknown.

Telamonanthe modesta (Goding).

Telamona modesta Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 420, 1894.

The original description follows:

Head triangular, hairy; ocelli nearer to each other than to the eyes. Prothorax broad, convex in front, gradually elevated back of lateral angles in a very high, much compressed, crest, the upper and anterior edges continuously curved to base of prothorax; posterior superior angle rectangular, posterior edge straight, inclined forward somewhat; posterior process long, depressed, acuminate, gradually attenuated to apex; sordid greenish yellow covered with black punctures, hairy, two black impressed dots over each eye, one above the other; base of posterior process and posterior edge of crest more or less free from black punctures. Tegmina with basal half of corium punctured, subtransparent. Legs triquetrous, tibiæ punctured with black, covered with spines. Abdomen and chest greenish-yellow.

Length, 8 mm.; breadth 4 mm.; altitude, 5 mm.

Habitat: Galesburg, Ill.

Distribution. Types from Illinois. There is a specimen in the Snow collection from Kansas City, Mo., so the species undoubtedly occurs in Kansas.

Hosts. Unknown.

GENUS ARCHASIA Stal.

The members of this genus are at once recognized by the broad, leaflike and compressed expansion of the pronotum.

Van Duzee separates the two species occurring in Kansas by the following key:

KEY TO SPECIES.

A. Dorsal edge distinctly brown or fuscous, the contour obviously concave before the apex. *belfragei.*

AA. Dorsal edge concolorous or faintly dotted with brown, contour scarcely if at all concave before the apex. *galeata.*

Archasia belfragei Stal.

Archasia belfragei Stal, Of. Vet. Akad. Forh., xxvi, p. 250, 1869.
Archasia canadensis Provancher, Pet. Faune Ent. Can., iii, p. 230, 1889.

Funkhouser gives the following technical description:

Green, fading to yellowish in cabinet specimens; pronotum high, strongly foliaceous, dorsal margin brown; tegmina about half concealed by pronotum; posterior process not reaching apices of tegmina.

Head nearly twice as wide as long, smooth, sparingly pubescent; base high and sinuate; eyes very prominent, shining dark brown; ocelli pearly, prominent, nearer to each other than to the eyes.

Pronotum closely but weakly punctate, not pubescent; humeral angles small, triangular; dorsal crest very high, flattened, foliaceous, almost vertical above head, slightly concave above head, posterior margin gradually hollowed out before apex of posterior process, entire dorsal margin flattened and uniformly brown.

Tegmina smoky hyaline, bases and costal margins punctate, tips strongly marked with brown. Undersurface of body yellow-brown; abdomen brown Legs dull yellow-brown; tibiæ pubescent.

Length, 9 mm.; width, 4.5 mm.; height of pronotum, 5 mm.

Distribution. Van Duzee reports this species from Ontario, Massachusetts, New York, New Jersey, North Carolina, Illinois and Michigan. There is a specimen in the Snow collection from Kansas City, Mo., so it undoubtedly occurs in Kansas also.

Hosts. Funkhouser gives locust and oak as hosts.

Archasia galeata (Fabricius.)

Membracis galeata Fabricius, Syst. Rhyng., p. 9, 1803.
Thelia galeata Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 309, 1846.
Smilia auriculata Emmons, Nat. Hist. N. Y. Ins., p. 153, pl. 3, fig. 12, 1854.

The following describes this species:

Green, fading to yellowish in cabinet specimens; pronotum very high and strongly foliaceous, dorsal margin concolorous or spotted with brown; tegmina about half concealed by pronotum; posterior process not reaching apices of tegmina.

Head slightly longer than in preceding species, smooth, sparingly pubescent; base high and sinuate; eyes very prominent, shining dark brown; ocelli pearly, prominent, nearer to each other than to the eyes.

Pronotum closely but distinctly punctate, sparsely pubescent; humeral angles smaller and more rounded than in preceding species and the dorsal crest higher, not concave above the head, with posterior margin not at all concave before apex of posterior process, the entire dorsal margin strongly flattened.

Tegmina smoky hyaline, bases and costal margins punctate, tips slightly darker. Entire undersurface and legs yellowish-brown, the tibiæ pubescent.

Length, 9-11 mm.; width, 4.5-5 mm.; height of pronotum, 6 mm.

Distribution. Van Duzee reports this species from Ontario, New York, New Jersey, Pennsylvania, North Carolina, Georgia, Florida, Illinois, Iowa, Colorado, Utah and Texas. Specimens are at hand from Douglas, Riley, Miami and Cowley counties, Kansas.

Hosts. Goding mentions *Eupatorium, Verbena hastata* and oak.

GENUS SMILIA Germar.

The members of this genus are of the same general shape as those of the preceding, because of the foliaceous dorsum, but the terminal cell of the hind wing is not sessile and truncate, but petiolate and triangular.

A single species occurs in Kansas.

Smilia camelus (Fabricius).

(Pl. VII, figs. 1, 2.)

Membracis camelus Fabricius, Syst. Rhyng., p. 10, 1803.
Smilia vittata Amyot & Serville, Hemip., p. 539, 1843.
Thelia camelus Walker, List Homop., ii, p. 562, 1851.
Thelia vittata Walker, List Homop., iv, p. 1143, 1852.
Smilia betulae Goding, Can. Ent., xxv, p. 196, 1893.
Antianthe compressa Buckton, Monog. Memb., p. 191, pl. 41, fig. 6, 1903.

Funkhouser gives the following technical description:

Pronotum high and foliaceous, extending forward over the head; brown with broad diagonal stripe of green or yellowish followed by a parallel translucent band and a white spot; males much smaller and darker than females.

Head triangular, sculptured, yellow with scattered brown punctures and hairs; eyes brown; ocelli pearly, margins raised, nearer to each other than to the eyes; clypeus continuing inferior line of face, apex slightly produced.

Pronotum coarsely punctured, punctures farther apart in pale parts; wide green band extending from anterior dorsal angle of crest to lateral margin of pronotum, this band fading to yellowish in dried insects; wide translucent band from behind middle of dorsum to lateral base of crest; white spot at posterior base of crest; humeral angles hardly produced, short, rounded; posterior process short, pointed, not reaching tips of tegmina.

Tegmina hyaline, bases punctate with brown, apices brown. Undersurface of body brownish yellow. Legs flavous.

Length: female, 9 mm.; male, 7-8 mm. Width: female, 3 mm.; male, 2.5-3 mm.

Internal male genitalia. Styles with anterior portions broadened and flattened as in *Telamona,* the sparsely spined posterior portions of nearly same width to the laterally curved and doubly toothed apices; connective large, broad, much as in *Telamona;* œdagus, viewed laterally, large, U-shaped, anterior arm lightly chitinized and longer than the more heavily chitinized posterior arm, with a distinct knob at base and also about midway up the anterior arm, the posterior arm with functional orifice on caudal aspect of apex and covered with teeth on the cephalic aspect.

Distribution. Van Duzee reports this species from Ontario, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, North Carolina, Georgia, Florida, Illinois, Michigan, Iowa, Missouri, and Texas. Specimens have been taken in Kansas in Douglas and Montgomery counties.

Hosts. Funkhouser gives locust and oak as hosts.

GENUS CYRTOLOBUS Goding.

The members of this genus are usually brownish insects without prominent humeral angles, with a compressed dorsum, and frequently with a thin, semitransparent spot below the dorsal ridge.

The genus is represented by at least nine species in Kansas, which live on various species of oaks.

Van Duzee divides the genus into four subgenera which he separates by the following key:

KEY TO SUBGENERA.

Pronotum strongly inflated posteriorly, the crest forming an inflated cyst before and behind the median pale spot. *Xantholobus.*

Pronotum not strongly inflated, the crest however, usually more or less distinctly compressed on the median spot..... 1

1. Dorsal crest low and sinuated at the middle; form elongated and much depressed. *Evashmeadea.*

   Dorsal crest not distinctly sinuated above..... 2

2. Crest highest anteriorly over or before the humeral angles, the dorsum sloping and nearly rectilinear to the apex. *Atymna.*

   Crest regularly arcuated above in the more typical examples, or in any case with the highest point at or near the middle. *Cyrtolobus.*

Subgenus CYRTOLOBUS Goding.

KEY TO SPECIES.

A. Dorsum without anterior notch or depression.
  B. Crest well developed. *celsus.*
  BB. Crest distinctly lower. *fenestratus.*
AA. Dorsum with anterior depression before elevation.
  B. Crest arising before humeral angles. *fuliginosus.*
  BB. Crest arising behind humeral angles.
    C. Large species, at least 9 mm. in length. *tuberosus.*
    CC. Small species, not over 7 mm. in length.
      D. Crest low or obsolete.
        E. Species distinctly brownish. *griseus.*
        EE. Species distinctly greenish. *cinereus.*
      DD. Crest well developed; pronotum with distinct oblique bands. *vau.*

Cyrtolobus celsus Van Duzee.

Cyrtolobus celsus Van Duzee, Check List Hemip., p. 60, 1916 (n. n. for *fenestratus* Van D.).

Cyrtolobus fenestratus Van Duzee, Bul. Buf. Soc. Nat. Sci.; ix, p. 81, 1908.

The following is the original description:

Pronotum well elevated, highest at about the middle, almost regularly arcuated from base to tip, the dorsal line a very little broken at the posterior vitta. Head and the pronotum anterior to the oblique line pale yellowish testaceous, punctured and varied with brown; from above each eye a brown indefinite vitta curves backward over the humeral angle; anterior oblique vitta almost perpendicular at first, approaching the elongated median mark, then deflected and again widened at apex so as to pass almost straight across the dorsal carina; posterior vitta transverse, represented in my Atlanta specimen only by a narrow spot on the carina; the surface behind the anterior vitta darker, in one example almost piceous. Elytra hyaline, the smoky apex small and pale.

Face coarsely punctured; clypeus broad, moderately produced, and strongly incurved.

Length, 6 mm.; height, 3 mm.

Distribution. Van Duzee reports this species from Massachusetts, New York, New Jersey and Georgia. It has also been taken near Kansas City, Mo., and therefore undoubtedly occurs in Kansas.

Cyrtolobus fenestratus (Fitch).

Cyrtosia fenestrata Fitch, Homop. N. Y. St. Cab., p. 49, 1851.
Cyrotolobus fenestratus Goding, Can. Ent., xxv, p. 172, 1893.
Cyrtolobus muticus Van Duzee, Bul. Buf. Soc. Nat. Sci., ix, p. 83, 1908 (in part).

The following is the original description:

Yellow marbled with rufous; a pellucid spot behind the summit of the keel and a smaller one halfway to the apex; an oblique yellow vitta below the anterior spot, margins with fuscous or sanguineous; tip of the thorax reaching beyond the terminal cells of the elytra. Male black, the pellucid spots almost obsolete and the yellow vitta replaced by a few yellow dots.

Length, 0.25. On oaks.

Distribution. Van Duzee reports this species from Massachusetts, New York, New Jersey, Pennsylvania, North Carolina, Georgia, Florida, Mississippi, Ohio, Illinois, Colorado, Dakota. Specimens have been taken at Kansas City, Mo., so it surely occurs in Kansas.

Cyrtolobus fuliginosus (Emmons).

Cyrtosia fuliginosa Emmons, Nat. Hist. N. Y. Ins., p. 154, pl. 13, fig. 15, 1854.
Cyrtolobus fuliginosus Goding, Can. Ent., xxv, p. 172, 1893.

Funkhouser gives the following technical description:

Near *C. ovatus* in appearance, but smaller, darker, and with lower crest; dark sordid brown with faint transverse bands; head projecting slightly forward; posterior process just reaching tips of tegmina; tegmina strongly marked with brown, apices lighter.

Head somewhat extended forward, yellow, mottled with deep brown, deeply punctate with brown, not pubescent, a black spot at base of head above each ocellus; eyes large, brown, lighter in color than remainder of head; ocelli small, pearly, about equidistant from each other and from the eyes; clypeus convex, sculptured, a brown line on each side, tip continuing rounded inferior outline of face.

Pronotum dark brown, transverse fascia extending from anterior base of crest to lateral margin of pronotum, this fascia light brown before and very dark brown behind; entire pronotum deeply and densely punctate; humeral angles weak, angular but blunt; dorsal crest regularly arcuate from above humeral angles to base of posterior process; posterior process heavy, short, blunt, just reaching apices of tegmina.

Tegmina smoky brown, apical cells lighter, apical margins fuscous, bases and costal margins roughly punctate. Legs and undersurface of body flavous.

Length, 6 mm.; width, 2.5 mm.

Distribution. Hitherto reported only from New York. Specimens have been taken, however, at Kansas City, Mo., and so it may safely be included in the Kansas fauna.

Hosts. Funkhouser reports it from white oak.

Cyrtolobus tuberosus (Fairmaire).

Thelia tuberosus Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 307, 1846.
Cyrtolobus tuberosus Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 433, 1894.

Funkhouser gives the following technical description:

Largest species of the genus; brown mottled with darker brown; dorsal compression strikingly transparent; dorsal crest situated well back on pronotum, posterior process very short; tegmina smoky hyaline tipped with brown.

Head triangular, broader than long, ochraceous tinged with red and punctate with brown, not pubescent; base weakly sinuate; inferior margin of face strongly sinuate; eyes large, brown; ocelli small, yellowish, slightly protruding, nearer to each other than to the eyes; clypeus convex, brown line on each side, tip extended and hairy.

Pronotum deeply and closely punctate, light greenish brown; crest dark brown with pale compression at anterior base, in the middle, and at posterior base; middle compression very large and transparent, posterior half of crest dark brown with color extending in a dark band to margin of pronotum; metopidium very convex, median carina prominent; humeral angles prominent, rounded; posterior process short, sharp, brown, inferior lateral margin slightly sinuate, not reaching tips of tegmina.

Tegmina brownish hyaline, tips strongly marked with brown, bases punctate. Undersurface of thorax yellow. Legs ferruginous, hind trochanters marked with brown; tarsi flavous; claws brown.

Length, 9.5 mm.; width, 4 mm. Male smaller than female, but similarly colored.

Distribution. Reported by Van Duzee from Massachusetts, New York, North Carolina, Georgia, Florida, Mississippi and Illinois. There is a specimen in the Snow collection from Kansas City, Mo., so it is sure to occur in Kansas.

Hosts. Funkhouser reports it from red oak and hickory.

Cyrtolobus griseus Van Duzee.

Cyrtolobus griseus Van Duzee, Bul. Buf. Soc. Nat. Sci., ix, p. 90, 1908.

The following is the original description:

This form, which is very near *cinereus,* is of an almost uniform dark cinerous, closely punctured with fuscous. The only conspicuous marking is the oblique blackish vitta which in *cinereus* bounds the hind margin of the anterior oblique vitta. Before and behind this brown band or line the surface is a little lighter and there is a suggestion of the median dorsal spot and transverse posterior vitta. In some specimens there is an arcuated longitudinal brown vitta on either side of the metopidium. Here the elytra are hyaline with the costal base ferruginous grey and punctured, and the apex has a small fuscous cloud.

The tergum is black with a broad white band at the base as in the allied species, which, showing through the closed elytra, indicates the markings found on the elytra of *cinereus*. Face obviously longer and more convex than in *cinereus*, with the basal middle depressed, and the clypeus and loræ together larger, the former much broader, more convex and more decurved and rounded at apex.

Distribution. The type material was taken at Effingham, Kansas.

Cyrtolobus cinereus (Emmons).

Gargara cinereus Emmons, Nat. Hist. N. Y. Ins., p. 156, pl. 13, fig. 3, 1854.
Cyrtosia ornata Provancher, Pet. Faune Ent. Can., iii, p. 240, 1889.
Cyrtosia cinerea Harrington, Ottawa Nat., vi, p. 30, 1892.
Cyrtolobus cinereum Goding, Can. Ent., xxv, p. 172, 1893.
Atymna cinereum Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 436, 1894.
Cyrtolobus cinereus Van Duzee, Bul. Buf. Soc. Nat. Sci., ix, p. 91, 1908.

Funkhouser gives the following technical description:

Small greenish gray mottled with brown and banded with green; pronotum low and regularly arcuate; metopidium convex; posterior process short but sharp; tegmina wrinkled, hyaline, apices brown.

Head convex, pale grayish green, sharply punctate with black, sparingly pubescent; base nearly straight; eyes prominent, brown; ocelli large, reddish, prominent, slightly farther from each other than from the eyes and situated slightly below an imaginary line extending through centers of eyes; clypeus flat, somewhat trilobed, a faint brown line on each isde, extending below inferior margin of face.

Pronotum green-gray tinged with reddish, closely punctate, not pubescent; dorsal crest very low, median spot on margin pale; a transverse pale band bordered with brown extending from anterior base of crest backward and downward to lateral margin of pronotum, a similar band extending from base of posterior process downward and forward to almost meet the anterior stripe and form a V with it; posterior process short, not reaching tips of tegmina.

Tegmina wrinkled, hyaline, brown spot at base of each, another in middle, and a third at tip; areas between hyaline. Legs and undersurface of body grayish flavous.

Length, 5.8 mm.; width 2.5 mm.

Distribution. Reported by Van Duzee from Quebec, New York and New Jersey. A single specimen of this species was taken in Douglas county, Kansas, and is in the Snow collection. Specimens have also been taken in Riley county.

Cyrtolobus vau (Say).

(Pl. VII, figs. 5, 6.)

Membracis vau Say, Jl. Acad. Nat. Sci. Phila., vi, p. 299, 1831.
Thelia semifascia Walker, List Homop., ii, p. 561, 1851.
Smilia vau Fitch, Homop. N. Y. St. Cab., p. 48, 1851.
Thelia vau Walker, List Homop., iv, p. 1142, 1852.
Cyrtosia vau Provancher, Pet. Faune. Ent. Can., iii, p. 238, 1889.
Cyrtosia fenestrata Provancher, Pet. Faune Ent. Can., iii, p. 239, 1889.
Cyrtolobus nigra Goding, Can. Ent., xxv, p. 172, 1893.
Cyrtolobus punctifrontis Goding, Can. Ent., xxv, p. 172, 1893.

Cyrtolobus tricincta Goding, Can. Ent., xxv, p. 172, 1893.
Cyrtolobus vau Goding, Can. Ent., xxv, p. 172, 1893.
Thelia fasciata Buckton, Monog. Membr., p. 189, 1893.
Argante semifasciata Buckton, Monog. Membr., p. 189, pl. 40, fig. 9, pl. 41, fig. 1, 1903.
Cyrtolobus varius Smith, Cat. Ins. N. J., edn. 3, p. 92, 1910.

Funkhouser gives the following technical description:

Small robust species, with low pronotum and prominent markings; varies greatly in color and somewhat in size; females larger and lighter than males, but with constant markings; transverse pronotal band prominent, pale bordered with deep brown; dorsal compression deep and translucent; posterior process short, blunt, not reaching tips of tegmina; tegmina hyaline, with bases and tips slightly brown.

Head small, subtriangular, pale yellow punctured with brown; base feebly sinuate; inferior margin of face sinuate, clypeus extending slightly below line; eyes large, gray-brown; ocelli small, yellowish, somewhat nearer to each other than to the eyes; clypeus hairy.

Pronotum closely and roughly punctate; median compressed spot round, transparent; dorsal crest low, arising above humeral angles and gradually extending with only a faint sinus before posterior process; posterior process short, blunt, tectiform, reaching to bases of apical cells of tegmina.

Tegmina hyaline, veins prominent, bases and apices smoky hyaline. Legs and undersurface of body uniform flavous.

Length, 5.5-6.5 mm.; width, 2.4-2.6 mm.

Internal male genitalia. Styles rather long and slender, curved strongly laterad apically, and bearing several spiny tubercles on the lateral margins just cephalad of the terminal tooth; connective triangular; œdagus, viewed laterally, large, U-shaped, anterior arm slightly chitinized and with a large prominence about half way on its cephalic aspect, posterior arm heavily chitinized, apex with file-like teeth on the side opposite the functional orifice.

Distribution. Reported by Van Duzee from Ontario, Maine, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, District of Columbia, North Carolina, Georgia, Florida, Illinois, Kansas, Missouri, Arkansas, Texas, New Mexico and Colorado. There are specimens in the Snow collection from Douglas, Riley, and Pottawatomie counties, Kansas.

Hosts. Funkhouser gives white, chestnut, red and scarlet oak as hosts.

Subgenus ATYMNA Stal.

In this subgenus the pronotum is highest at the anterior end. It is represented in Kansas by a single species.

Cyrtolobus querci (Fitch).

(Pl. VII, figs. 3, 4.)

Smilia querci Fitch, Homop. N. Y. St. Cab., p. 49, 1851.
Thelia querci Walker, List Homop., iv, p. 1143, 1852.
Gargara querci Emmons, Nat. Hist. N. Y. Ins., p. 156, pl. 13, fig. 8, 1854.

Atymna querci Van Duzee, Psyche, v, p. 390, 1890.
Cyrtolobus (*Atymna*) *querci* Van Duzee, Bul. Buf. Soc. Nat. Sci., v, p. 188, 1894.

Funkhouser gives the following technical description:

Females large and green, males smaller and brown with a broken yellow median dorsal stripe; body long and narrow; crest highest above humeral angles and gradually sloping to posterior apex without a sinus.

Female. Head projecting slightly forward, pale yellow, sculptured, irregularly punctate, not pubescent; eyes very prominent, reddish; ocelli not prominent, yellow; clypeus extending below inferior margin of face.

Pronotum uniform green, roughly punctate, not pubescent, dorsal line faintly marked with brown; posterior process short, acute, not reaching tips of tegmina.

Tegmina entirely hyaline, bases and costal margins faintly punctate; hind wings iridescent. Legs and undersurface of body green.

Length, 7 mm.; width, 2.5 mm.

Male. Head sordid yellow, sculptured, sparingly punctate; eyes prominent, brown; ocelli pearly; clypeus marked with brown at base.

Pronotum chocolate brown with bright yellow stripe on median dorsal line and yellow band before apex.

Tegmina smoky hyaline with brown cloud at apices. Undersurface of thorax brownish; abdomen very dark brown, nearly black. Legs flavous; tarsi ferruginous; claws fuscous.

Length, 6 mm.; width, 2 mm.

Internal male genitalia. Styles small, anterior portion quite short, posterior portions larger, bearing spiny protuberances apically; connective rather large, triangular; œdagus, viewed laterally, very large compared with the styles, anterior arm long and slender, posterior arm stout and with many filelike teeth on the side opposite the functional orifice.

Distribution. Van Duzee reports this species from Ontario, Connecticut, New York, Pennsylvania, North Carolina, Georgia, Illinois, Michigan, Iowa and Missouri. Specimens having been taken at Kansas City, Mo., it is sure to occur in Kansas.

Subgenus XANTHOLOBUS Van Duzee.

In this subgenus the pronotum is distinctly inflated posteriorly. It is represented in Kanas by a single species.

Cyrtolobus muticus (Fabricius).

Membracis mutica Fabricius, Genera Ins., p. 297, 1776.
Cicada mutica Gmelin *in* Linnaeus, Syst. Nat., edn. 13, i, pt. 4, p. 2093, 1778.
Centrotus mutica Fabricius, Syst. Rhyng., p. 21, 1803.
Membracis trilineatus Say, Long's 2nd. Exped., p. 300, 1824; Compl. Writ., i, p. 200.
Cyrtosia mutica Stal, Hemip. Fabr., ii, p. 25, 1869.
Cyrtosia trilineata Provancher, Pet. Faune Ent. Can., iii, p. 239, 1889.
Cyrtolobus muticus Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 431, 1894.

Funkhouser gives the following technical description:

Yellowish tinged with red; transverse band of pronotum often absent; pronotum long; head slightly projecting forward; eyes tinged with reddish; posterior process reaching tips of tegmina; tegmina entirely hyaline or faintly clouded with yellow.

Head slightly protruding forward, yellow with red punctures, sculptured, not pubescent; base irregularly sinuate; eyes gray marked with red; ocelli small, translucent, somewhat nearer to each other than to the eyes; clypeus swollen, convex, continuing inferior outline of face, tip slightly extended, hairy; antennæ prominent.

Pronotum yellowish with irregular reddish areas, deeply and roughly punctate, not pubescent; transverse band when present pale with reddish borders; humeral angles weak, blunt; dorsal crest elliptical, very slight sinus before base of posterior process, compressions not deep; posterior process heavy, blunt, just reaching tips of tegmina.

Tegmina hyaline or clouded with reddish yellow, tips pale, veins in some cases yellowish, bases and costal areas irregularly punctate. Legs and undersurface of thorax flavous; abdomen sordid yellow.

Length, 6 mm.; width, 2.8 mm.

Distribution. Reported by Van Duzee from Quebec, Rhode Island, New York, Pennsylvania and Illinois. In the Snow collection there are specimens from Kansas City, Mo., and some taken in Douglas county, Kansas. The writer took a specimen at St. Paul, Minn.

GENUS OPHIDERMA Fairmaire.

The members of this genus have a compressed and rounded dorsum which entirely lacks a crest.

It is represented in Kansas by three species, which may be separated by the following key:

KEY TO SPECIES.

A. Color, brown or mottled.
  B. Species smaller, mottlings more distinct. *salamandra.*
  BB. Species larger, mottling dull. *flaviguttula.*
AA. Color, green or yellowish green. *flava.*

Ophiderma salamandra Fairmaire.

(Pl. VI, figs. 1, 2.)

Ophiderma salamandra Fairmaire, Ann. Soc. Ent. Fr., ser. 2, iv, p. 493, 1846.

Funkhouser gives the following technical description:

Large brown species; dorsum rounded and very pubescent with short, black, bristly hairs; posterior process short, suddenly acute, not reaching apices of tegmina; tegmina hyaline, bases and costal areas strongly punctate, tips clouded with fuscous, veins very prominent; under part of body dark; males smaller and darker than females.

Head broader than long, yellow, feebly punctate, very hairy; base slightly, uniformly curved; eyes large, brown; ocelli prominent, red, nearer to each other than to the eyes; inferior margin of face sinuate; clypeus yellow with two vertical stripes of red; base hairy.

Pronotum coarsely punctate, densely pubescent, brown mottled with green; dorsum rounded, slightly depressed behind middle, lateral margin curved downward at middle; posterior process short, suddenly acute, not reaching tips of tegmina.

Tegmina smoky hyline, veins very prominent, nearly all of basal half below pronotum strongly punctate, tips clouded with fuscous; hind wings iridescent. Undersurface of head and thorax fuscous; abdomen flavous. Femora and tibiæ strongly marked with dark brown.

Length, 7.6 mm.; width, 3.2 mm.

Internal male genitalia. Styles rather short and broad, especially basally, posterior portion more slender, apices curved strongly laterad and ending in a small but distinct terminal hook on the lateral margin, in front of which is a distinct prominence which tapers gradually to the hook, the apical fourth of the styles bearing a few spines; connective almost pentagonal, with a pair of distinct knobs at the basal angles; œdagus, viewed laterally, U-shaped, anterior process with a large anterior prominence near the middle, posterior arm curved, the apex bearing the functional orifice caudally and many filelike and distinct teeth on its cephalic aspect.

Distribution. Reported by Van Duzee from Ontario, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, District of Columbia, Virginia, Georgia, Florida, Illinois and Michigan. There are specimens in the Snow collection also from Wisconsin, Arizona and Kansas City, Mo. It has also been taken in Pottawatomie county, Kansas.

Hosts. Oaks.

Ophiderma flaviguttula Goding.

Ophiderma flaviguttula Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 438, 1894.
Ophiderma flavoguttata Slosson, Ent. News, xvii, p. 326, 1906.

The original description follows:

Female. Head triangular, yellowish; eyes prominent, dark brown; ocelli equidistant from each other and from the eyes, red; convex, densely pubescent. Prothorax with very slight median carina, densely pubescent, an irregular yellow patch starting at lateral border and extending upwards and forwards, midway between base and apex; an irregular band at base, concolorous with head, extending along sides in a greenish gray line; otherwise dirty brown, lightly punctured; apex of posterior process not reaching apex of tegmina. Tegmina subcoriaceous at base, lightly punctured, basal half and apex brown. Below yellow, feet and legs brown.

Length, 6.2 mm.

Distribution. Reported by Van Duzee from New Hampshire, Pennsylvania and Illinois. There are specimens in the Snow collection from Kansas City, Mo., so it undoubtedly occurs in Kansas.

Hosts. Probably oak.

Ophiderma flava Goding.

Ophiderma flava Goding, Insect Life, v, p. 93, 1892 (nomen nudum).
Ophiderma flava Goding, Bul. Ill. St. Lab. Nat. Hist., iii, p. 439, 1894.

Funkhouser gives the following technical description:

Large greenish yellow species, fading to sordid yellow in cabinet specimens; body robust and long; posterior process not reaching apices of tegmina; tegmina hyaline, brown at base and fuscous-clouded at tips.

Head much broader than long, green, weakly and sparingly punctate, smooth, shining, sparingly pubescent; eyes large, red; ocelli prominent, reddish, about equidistant from each other and from the eyes; clypeus smooth, nearly black, base regularly rounded, tip extending below inferior margin of face.

Pronotum uniform green, in some cases tinged with reddish, closely and densely punctate, finely pubescent; dorsum rounded, depressed behind middle, median carina percurrent; posterior process heavy, tectiform, acute, not extending to tips of tegmina.

Tegmina hyaline, bases reddish and punctate, tips clouded with fuscous, veins heavy and inclined to be punctate along margin. Legs and undersurface of body entirely flavous.

Length, 7-8 mm.; width, 3-4 mm.

Distribution. Reported by Van Duzee from Quebec, Massachusetts, New York, Pennsylvania, North Carolina, Illinois, Michigan. There are specimens in the Snow collection from Columbia, Mo., and from Chautauqua county, Kansas.

Hosts. Unknown.

GENUS VANDUZEA Goding.

The members of this genus are distinguished by the transverse and basally truncate terminal cell of the elytra.

A single member of the genus is known to occur in Kansas.

Vanduzea triguttata (Burmeister).

(Pl. VI, figs. 7, 8.)

Entylia triguttata Burmeister, Silb. Rev. Ent., iv, p, 183, 1836.
Vanduzea vestita Goding, Insect Life, v, p. 93, 1892.
Cyrtolobus annexus (Uhl. MS) Townsend, Can. Ent., xxiv, p. 196, 1892.

The following is Goding's description:

Head broad, black, perpendicular, triangular, a narrow dusky brown mark on upper edge just below origin of carina. Eyes prominent; ocelli equidistant from each other and the eyes. Front of prothorax blackish brown, fading posteriorly to a reddish brown in a triangular form, the apex of which reaches

three-fourths of the distance to apex of posterior process; lateral angles slightly produced; sides of prothorax from just behind lateral angles to apex black, interrupted by a light yellow, or whitish, trapezoidal spot on each side just behind middle of inferior border; just before the apex a white band across posterior part of process. Tegmina clear, with dark brown veins, or brown with a lighter band across middle. Legs and feet brown or black.

Length, 4.7 mm.

Internal male genitalia. Styles broad and flat basally, apical half slender, apices curved strongly dorsad and ending rather bluntly, bearing a few spines; connective nearly quadrangular, the base concave; œdagus, viewed laterally, U-shaped, anterior arm enlarged toward the base, posterior arm of nearly same width throughout, the apex bearing caudally the functional orifice and cephalad many filelike teeth.

Distribution. Reported by Van Duzee from District of Columbia, Florida, Colorado, New Mexico and Arizona. The writer has taken it at St. Paul, Minn. It has been taken in the following Kansas counties: Morton, Clark, Stevens, Logan, Haskell, Seward, Riley, Hamilton, Pottawatomie, Douglas and Miami.

Hosts. Common on black locust. Also taken by the writer on *Amorpha.*

GENUS ENTYLIA Germar.

The members of this genus are characterized by their high compressed dorsum, which bears a deep median notch.

A single species of the genus is known to occur in Kansas.

Entylia concisa Walker.

(Pl. VI, figs. 5, 6.)

Entylia concisa Walker, List Homop., ii, p. 547, 1851.
Entylia decisa Walker, List Homop., ii, p. 548, 1851.
Entylia concava Provancher, Pet. Faune Ent. Can., iii, p. 233, 1889.

The following is the original description:

Ferruginea; prothoracis carina altè bicristata, utrinque albo interruptè et obliquè fasciata; pedes flavi; alæ limpidæ; alæ anticæ basi et ad costam fulvæ.

Ferruginous; head and thorax roughly punctured; head transverse, almost semicircular, narrower than the fore-chest, slightly impressed with an indistinct middle suture which extends to the face, the hind border of the latter is angular and occupies nearly half the length of the head; shoulders very obtusely angular, not prominent: fore-chest forming two lofty compressed keel-shaped crests which incline towards each other and inclose three-fourths of a circle; the first rises between the shoulders and is truncated at the tip; the second is lower and above the keel; the latter is rather deep and extends far beyond the tip of the abdomen, whose sides it embraces; the irregular ridges on the sides of the crest communicate with the ridges of the keel, and the latter has an oblique white interrupted band on each side behind the second

crest; breast pitchy; abdomen black; a stripe on each side beneath and the tip yellow; legs yellow; wings colorless; fore-wings tawny at the base and along more than half the length of the fore border; veins pitchy, tawny where the wings are so, pale yellow near the tip of the fore border.

Length of the abdomen, 2½ lines; of the wings, 4½ lines.

Var. β. Breast and abdomen tawny; white bands of the keel hardly visible.

Var. γ. Breast and abdomen black; tip of the latter tawny.

St. John's Bluff, E. Florida.

Internal male genitalia. Styles small, anterior portion narrow, posterior part stouter, the apices curved strongly laterad and ending in a stout hook; connective large, triangular, apex abtuse, and longitudinally divided; œdagus, viewed laterally, U-shaped, anterior arm with a distinct protuberance, posterior arm stouter and ending in a large, serrated point.

Distribution. Van Duzee reports this species from District of Columbia, North Carolina, Georgia and Florida. It has been taken in Douglas, Pottawatomie and Wilson counties, Kansas.

Remarks. Funkhouser feels that *E. sinuata* is the very small southern form, *E. bactriana* the northeastern, and that *E. concisa* is our Kansas species. In the present confused status of the members of this genus it is perhaps best to accept his conclusions and to change our Kansas species to *E. concisa* instead of calling it *E. sinuata,* as did Miss Branch.

Hosts. Miss Branch reports this species from *Melilotus alba, Cnicus altissimus, Phleum alpinum, Helianthus annuus, Medicago sativa,* and *Ambrosia* sp. The writer has taken it very commonly in all its stages from *Ambrosia trifida, Xanthium* sp., and *Helianthus tuberosus.*

GENUS PUBLILIA Stal.

The members of this genus are closely related to those of the preceding genus, but have a much lower crest and a much weaker median notch.

All of the members of the genus found in the United States occur in Kansas. These may be separated by the following key given by Van Duzee.

KEY TO SPECIES.

A. Dorsum straight or feebly arcuated, scarcely if at all sinuated; form more slender. *modesta.*

AA. Dorsum more elevated, obviously sinuated.

B. Sides of the pronotum with longitudinal rugæ which become more or less reticulated along the dorsum. *concava.*

BB. Rugæ of the pronotum strong, irregularly reticulated over its whole surface. *reticulata.*

Publilia modesta Uhler.

(Pl. VI, fig. 3, 4.)

Publilia modesta Uhler, Bul. U. S. Geol. Geog. Surv., i, p. 344, 1876.
Publilia bicinctura Goding, Ent. News, iii, p. 200, 1892.

The original description follows:

General form of *P. concava* Say, but more decidedly vertical in front, and with the dorsal outline scarcely depressed before the middle; apex of the pronotum more slender and acute. Color pale yellow; the head and fore part of pronotum clouded with pale brown; a spot above the humeri, a broad oblique band behind the middle, and a broad cloud on the apex grayish brown; the dorsal edge irregularly spotted with dark brown, and the oblique band surmounted by a large brown spot. The surface closely beset with series of coarse sunken punctures; the longitudinal and reticulated surface lines obsolete. Humeral margin of the sinus waved. Under side piceo-testaceous; the front, clypeus, pectus and venter, excepting the edges of the segments, black-piceous. Legs dull yellow, closely pubescent, clouded, and spotted with brown.

Length, 4 to 4½ mm.; breadth of pronotum, 2 mm.

Colorado (C. Thomas); also discovered in Utah, Dakota, Arizona, New Mexico, California.

In two specimens examined, the commonly raised lines on the surface of the pronotum were obliterated.

Distribution. Besides the above localities specimens have been taken in Kansas in Gove and Trego counties.

Hosts. Gillette and Baker report this species on *Solidago*, alfalfa, *Helianthus*, *Iva*, and *Artemesia*. Goding gives *Glycyrrhiza lepidota* and mesquite as hosts.

Publilia concava (Say).

Membracis concava Say, Long's 2nd Exped., ii, p. 301, 1824; Compl. Writ., i, p. 200.
Entylia concava Germar, Silb. Rev. Ent., iii, p. 249, 1835.
Publilia concava Stal, Analecta Hem., p. 388, 1866.
Ceresa concava Rathvon, in Mombert's Hist. Lanc. Co., Pa., p. 551, 1869.
Publilia grisea Buckton, Monog. Membr., p. 184, pl. 39, fig. 5, 1903.
Publilia vittata Buckton, Monog. Membr., p. 185, pl. 39, fig. 6, 1903.

Funkhouser gives the following technical description:

Varies greatly in color and somewhat in shape, particularly in form of dorsal sinuation; color varies from gray to black; dorsum convex, tectiform, faintly ribbed, dorsal sinus shallow; pronotum irregularly ridged, deeply punctate; tegmina largely covered by pronotum, basal half of each costal area strongly punctate.

Head slightly projecting, strongly punctate with black; base nearly straight; inferior margin rounded; eyes not prominent; ocelli prominent, usually reddish; clypeus rounded, very wide at tip.

Pronotum deeply, densely and coarsely punctate, lateral areas marked with high, distinct, irregular, longitudinal ridges; dorsal margin sinuate just behind humeral angles, sinuation usually very shallow; posterior lobe gradually elliptical to posterior apex; posterior process heavy, high, tectiform, blunt, extending just beyond tips of tegmina.

Tegmina almost entirely concealed by pronotum; exposed costal margins opaque and punctate for basal half, apical areas hyaline, tips fuscous. Undersurface of body and femora usually very dark, generally black. Legs flavous.

Length, 5 mm.; width, 2.5 mm.

Internal male genitalia. Styles long and slender, the extreme anterior portion bent strongly laterad, widest opposite connective, the posterior part with distinct apical hook; connective widest at the concave base, the apex truncate; œdagus, viewed laterally, with strong anterior arm which bears two prominent rounded prominences, the posterior arm more slender, the apical portion bearing a few indefinite teeth on caudal margin and the apex characteristically retrorsely hooked.

Distribution. Van Duzee reports this species from Ontario, New York, New Jersey, North Carolina, Ohio, Illinois, Iowa, Missouri, Kansas, Arkansas, and Utah. It is also known to occur in Mexico. Specimens have been taken in Kansas in Douglas, Pottawatomie, Riley, and Gove counties.

Hosts. Funkhouser gives golden rod and skunk cabbage as hosts. Goding mentions Canadian thistle. The writer has taken it in all stages on *Ambrosia trifida.*

Publilia reticulata Van Duzee.

Publilia reticulata Van Duzee, Bul. Buf. Soc. Nat. Sci., ix, p. 106, 1908.

The following is the original description:

Closely allied to *concava* but with the surface of the pronotum reticulated with strong anastomosing rugæ in place of the four or five simple longitudinal carinæ found in that species. These rugæ give the surface a strongly corrugated or areolated appearance. Surface between the rugæ deeply punctured. Metopidium more vertical than in *concava*, the percurrent carina more elevated and the dorsal sinus somewhat deeper. Apical margin of the head distinctly sinuated next the eye, then very obtusely arcuated about the apex. Color blackish or fuscous, speckled or blotched more or less with testaceous on the head and front of the pronotum as far as the dorsal sinus; and with a triangular whitish testaceous spot on the apical fourth of the lateral margin, which may be prolonged somewhat along the margin anteriorly and indistinctly across the disk as an incomplete subapical vitta. Venter, tibiæ and tarsi pallid, the disk of the ventral segments more or less black.

Length, 4 mm.

Distribution. Van Duzee reports this species from New Jersey, Pennsylvania, North Carolina and Missouri. There is a specimen in the Snow collection from Kansas City, Mo., and it has been taken in Riley county.

Hosts. Unknown.

PLATE II.

1. Styles and connective of *Ceresa bubalus.*
2. Œdagus of *Ceresa bubalus.*
3. Lateral aspect of *Ceresa taurina.*
4. Genitalia of *Ceresa taurina.*
5. Styles and connective of *Ceresa bubalus.*
6. Œdagus of *Ceresa bubalus.*
7. Genitalia of *Ceresa bubalus.*
8. Lateral aspect of *Ceresa bubalus.*

PLATE II.

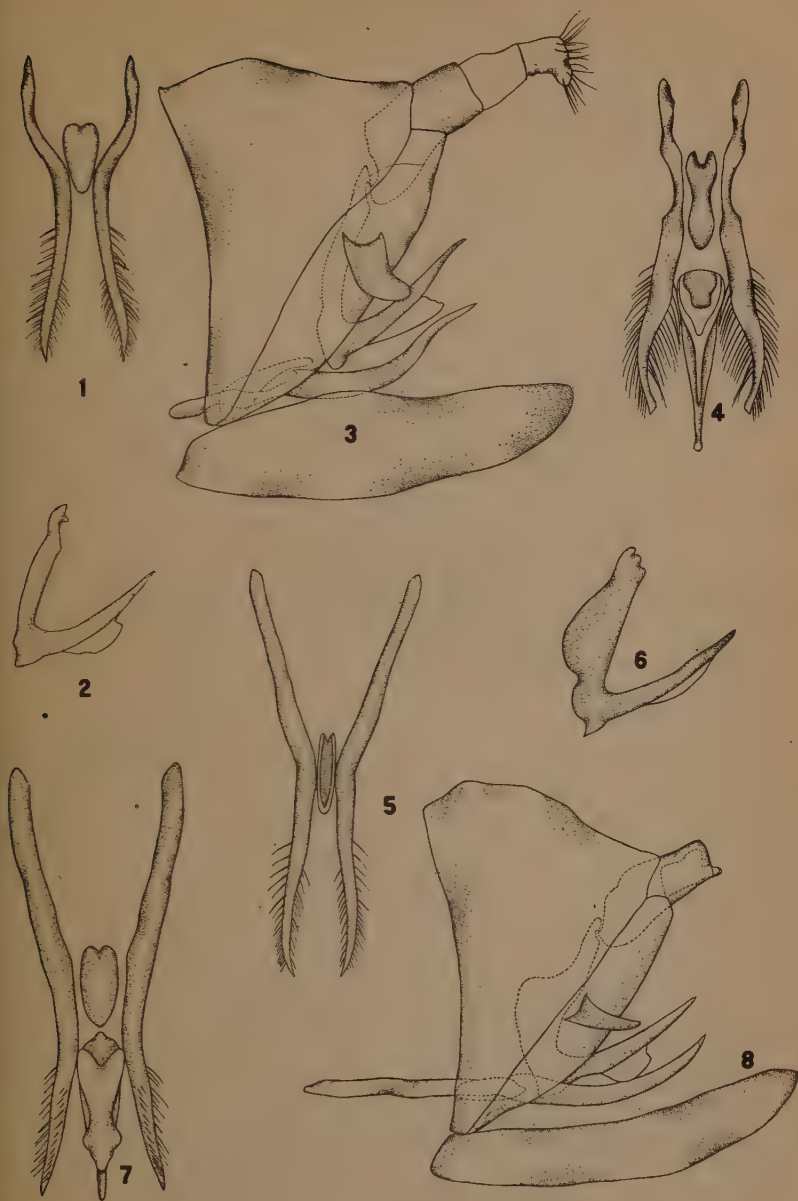
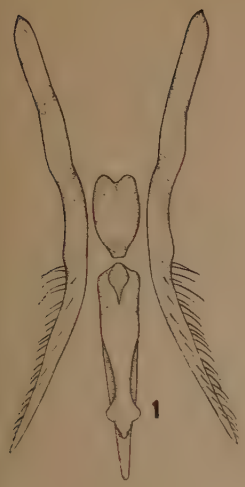
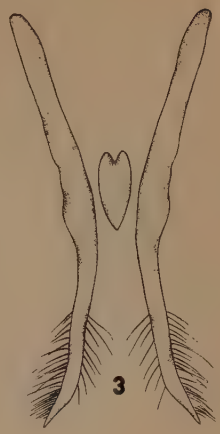


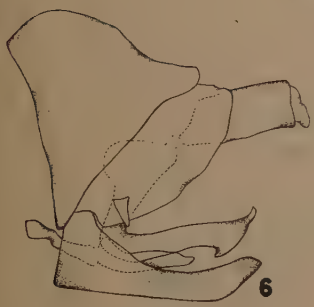
PLATE III.

1. Genitalia of *Ceresa diceros.*
2. Œdagus of *Ceresa diceros.*
3. Styles and connective of *Ceresa palmeri.*
4. Œdagus of *Ceresa palmeri.*
5. Styles and connective of *Stictocephala festina.*
6. Lateral aspect of *Stictocephala festina.*
7. Œdagus of *Ceresa borealis.*
8. Genitalia of *Ceresa borealis.*

PLATE III.







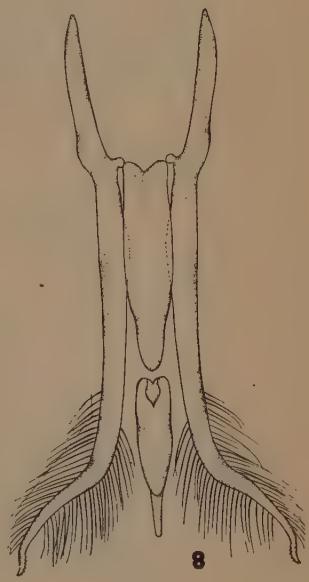
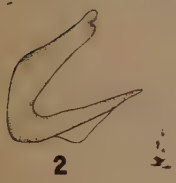
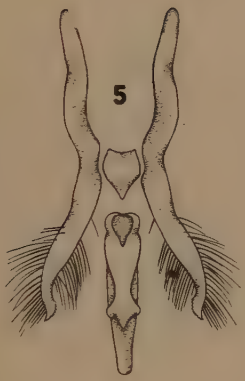


PLATE IV.

1. Genitalia of *Stictocephala inermis.*
2. Œdagus of *Stictocephala inermis.*
3. Genitalia of *Stictocephala lutea.*
4. Œdagus of *Stictocephala lutea.*
5. Genitalia of *Stictocephala inermis.*
6. Œdagus of *Stictocephala inermis.*
7. Lateral aspect of *Stictocephala inermis.*
8. Styles and connective of *Stictocephala inermis.*

PLATE IV.





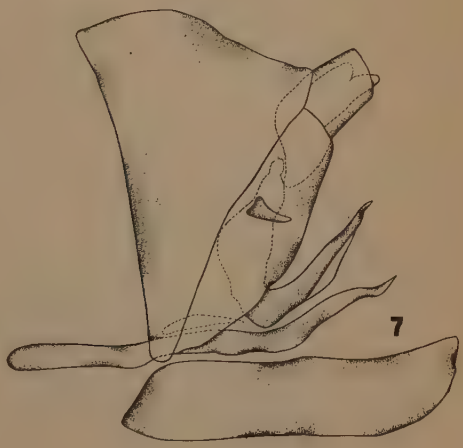
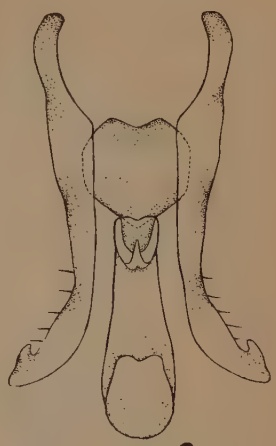
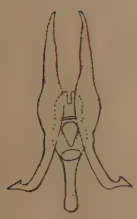


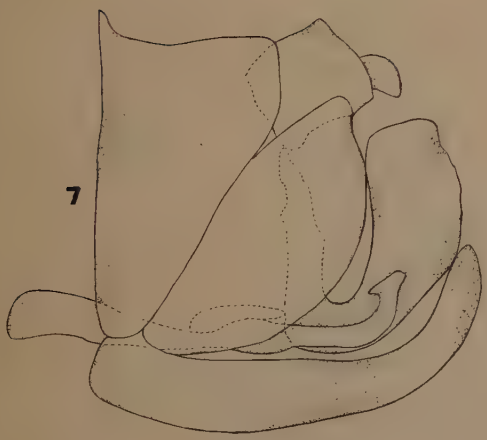
PLATE V.

1. Lateral aspect of genitalia of *Thelia bimaculata.*
2. Dorsal aspect of genitalia of *Thelia bimaculata.*
3. Dorsal aspect of genitalia of *Micrutalis calva.*
4. Lateral aspect of genitalia of *Micrutalis calva.*
5. Dorsal aspect of genitalia of *Acutalis tartarea.*
6. Lateral aspect of genitalia of *Acutalis tartarea.*
7. Lateral aspect of *Telamona pyramidata.*
8. Styles and connective of *Telamona pyramidata.*

PLATE V.







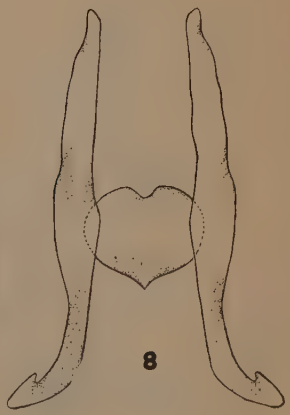


PLATE VI.

1. Lateral aspect of genitalia of *Ophiderma salamandra.*
2. Dorsal aspect of genitalia of *Ophiderma salamandra.*
3. Lateral aspect of genitalia of *Publilia modesta.*
4. Dorsal aspect of genitalia of *Publilia modesta.*
5. Dorsal aspect of genitalia of *Entylia concisa.*
6. Lateral aspect of genitalia of *Entylia concisa.*
7. Dorsal aspect of genitalia of *Vanduzea triguttata.*
8. Lateral aspect of genitalia of *Vanduzea triguttata.*
9. Lateral aspect of genitalia of *Campylenchia latipes.*
10. Ventral aspect of genitalia of *Campylenchia latipes.*
11. Dorsal aspect of genitalia of *Enchenopa binotata.*
12. Lateral aspect of genitalia of *Enchenopa binotata.*

PLATE VI.

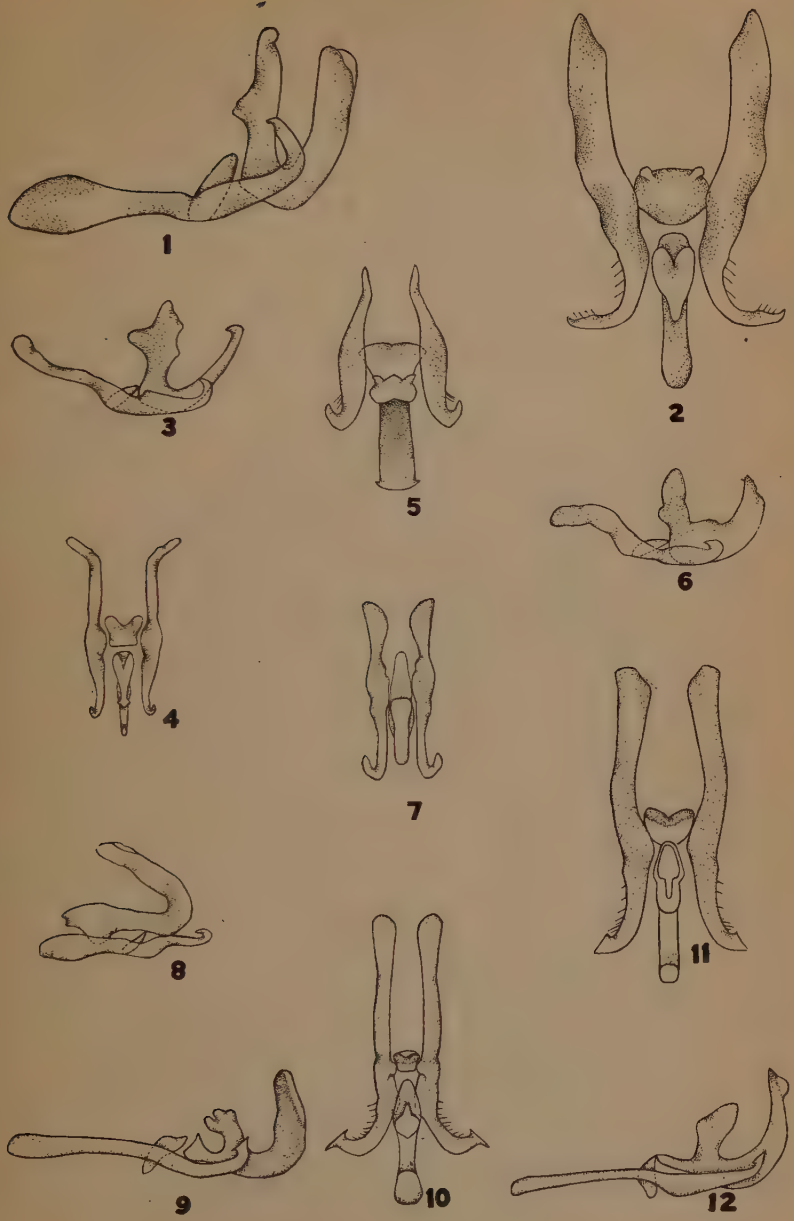


PLATE VII.

1. Lateral aspect of genitalia of *Smilia camelus.*
2. Dorsal aspect of genitalia of *Smilia camelus.*
3. Dorsal aspect of genitalia of *Cyrtolobus querci.*
4. Lateral aspect of genitalia of *Cyrtolobus querci.*
5. Dorsal aspect of genitalia of *Cyrtolobus vau.*
6. Lateral aspect of genitalia of *Cyrtolobus vau.*
7. Dorsal aspect of genitalia of *Telamona viridia.*
8. Lateral aspect of genitalia of *Telamona viridia.*

PLATE VII.

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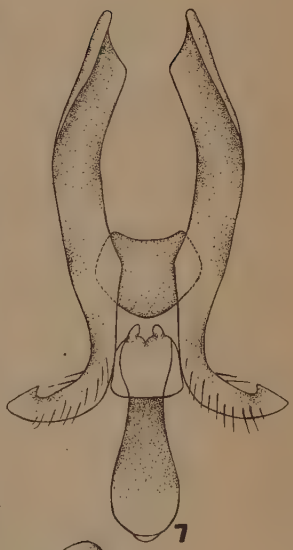
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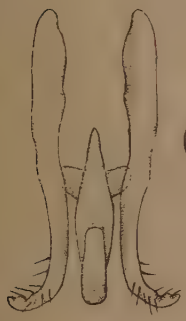
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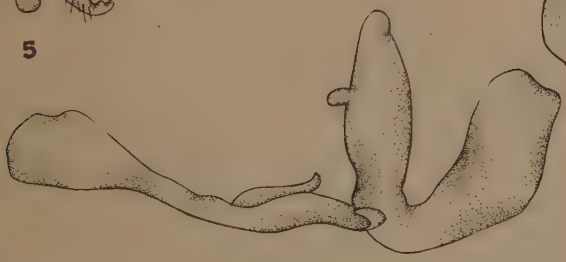
8

INDEX.

PAGE

acuminatus, Glossonotus 67
Acutalis 62
    tartarea 62
albescens, Ceresa 52
Archasia 78
    belfragei 78
    galeata 79
    Key to species 78
Atymna 85
belfragei, Archasia 78
bimaculata, Thelia 66
binotata, Enchenopa 49
borealis, Ceresa 54
brevicornis, Ceresa 55
bubalus, Ceresa 57
calva, Micrutalis 63
camelus, Smilia 80
Campylenchia 47
    latipes 47
caryæ, Microcentrus 45
Carynota 64
    mera 64
celsus, Cyrtolobus 81
Centrotinæ 45
Ceresa 51
    albescens 52
    borealis 54
    brevicornis 55
    bubalus 57
    diceros 51
    Key to species 51
    palmeri 53
    taurina 56
cinereus, Cyrtolobus 84
collina, Telamona 75
concava, Publilia 92
concisa, Entylia 90
cristata, Heliria 68
Cyrtolobus 80
    celsus 81
    cinereus 84
    fenestratus 82
    fuliginosus 82
    griseus 83
    Key to subgenera 81
    muticus 86
    querci 85

PAGE
Subgenus 81
Key to species 81
tuberosus 83
vau 84
decorata, Telamona 72
diceros, Ceresa 51
Distribution 32
Economic importance 43
Enchenopa 48
binotata 49
Entylia 90
concisa 90
extrema, Telamona 74
fenestratus, Cyrtolobus 82
festina, Stictocephala 61
flava, Ophiderma 89
flaviguttula, Ophiderma 88
fuliginosus, Cyrtolobus 82
galeata, Archasia 79
Genitalia, male 38
Glossonotus 67
acuminatus 67
griseus, Cyrtolobus 83
Heliria 68
cristata 68
Key to species 68
scalaris 68
inermis, Stictocephala 59
latipes, Campylenchia 47
Life history 41
List of species 44
lugubris, Telamona 72
lutea, Stictocephala 60
Membracinæ 47
Key to genera 47
mera, Carynota 64
Microcentrus 45
caryæ 45
Micrutalis 63
calva 63
modesta, Publilia 92
modesta, Telamonanthe 78
muticus, Cyrtolobus 86
obsoleta, Telamona 71
Ophiderma 87
flava 89
flaviguttula 88
Key to species 87
salamandra 87

PAGE
palmeri, Ceresa 53
Phylogeny 41
Publilia 91
concava 92
Key to species 91
modesta 92
reticulata 93
pyramidata, Telamona 70
querci, Cyrtolobus 85
querci, Telamona 73
reticulata, Publilia 93
rileyi, Telamonanthe 77
salamandra, Ophiderma 87
scalaris, Heliria 68
Smilia 79
camelus 80
Smiliinæ 50
Key to genera 50
Stictocephala 59
festina 61
inermis 59
Key to species 58
lutea 60
Structural characteristics 36
Subfamilies, Key to 45
tartarea, Acutalis 62
taurina, Ceresa 56
Telamona 69
collina 75
decorata 72
extrema 74
Key to species 69
lugubris 72
obsoleta 71
pyramidata 70
querci 73
unicolor 74
viridia 71
Telamonanthe 77
Key to species 77
modesta 78
rileyi 77
Thelia 65
bimaculata 66
Key to species 65
uhleri 65
triguttata, Vanduzea 89
tuberosus, Cyrtolobus 83
uhleri, Thelia 65

PAGE
unicolor, Telamona 74
Vanduzea 89
triguttata 89
vau, Cyrtolobus 84
viridia, Telamona 71
Xantholobus 86